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RUSTRATION AND REGRESSION
XPERIMENT WITH YOUNG CHILDREN

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FRUSTRATION AND REGRESSION

AN EXPERIMENT WITH YOUNG CHILDREN

systematic genetic psychology, they are radical and perhaps revolutionary undertakings.

There may be useful outcomes in terms of testing and rating procedures. If, in anything less than an optimum environment, children's behavior will deteriorate, it follows that improvement in the dynamics of living conditions will tend to raise standards. This process steadily invalidates any tests of intelligence, development or emotional adjustment that have been scaled in age units.

GEORGE D. STODDARD

Office of the Director
Iowa Child Welfare Research Station
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Chapter I

REGRESSION, RETROGRESSION, AND DEVELOPMENT

Definition of Regression

Frequency and Importance of Regression

In psychology the term regression refers to a primitivation of behavior, a "going back" to a less mature state which the individual has already outgrown. A temporary regression frequently occurs in tense emotional situations with normal adults and children, particularly if these emotions are unpleasant. Intense joy, too, may lead to certain primitive actions. Fatigue, oversatiation and sickness often cause temporary regression. A more or less permanent type of regression can be observed in certain cases of senility, in a great variety of neuroses and in functional and organic psychoses. Regression, therefore, has to be considered a common phenomenon which is related to many situations and problems, and concerns the total behavior of the person rather fundamentally.

There is a second reason why psychology should regard regression as an important topic, namely, the relation between regression and development. Knowledge of the process of psychological development has greatly increased during the last decade. We have learned particularly that the varieties of possible developments are much greater than might have been expected. However, our knowledge of the factors determining development, its dynamics and laws, is extremely meager. Regression can be said to be a negative development. The experimental study of regression seems to be technically somewhat easier than that of development. Therefore, the indirect way of studying the dynamics of development by studying regression may prove to be fruitful for the whole theory of development.

Regression, a Problem at the Intersection of Historical and Systematic Questions

The concept of regression has been brought to the fore by Freud and has been widely used in psychoanalytical literature. Freud has seen from the beginning how important the problem of regression is for the theory of development. His theory of the stages of libidinal organization which marks the development of a person is to a large degree based on his observations of regression in psychopathology (23, p. 285-299).

The term regression in psychoanalysis refers to a great variety of symptoms. Freud himself uses the term regression mainly to describe "a return to the first objects invested with libido, which we know to be incestuous in character, and a return of the whole sexual organization to earlier stages" (p. 287). In addition to speaking of "regression of the libido" Freud speaks of "regression of the ego" and "object-regression" (p. 299). In other psychoanalytical and psychological literature the term regression has been used more loosely; for instance, any kind of withdrawal from reality to a fantasy level has been called regression.

Freud himself emphasized that he used the term regression as a purely descriptive concept (p. 288) and not as a dynamic concept like repression. Nevertheless, he has brought forth certain ideas about the factors which make for regression. According to him two main conditions for regression exist: (1) fixation of the libido to objects of a previous developmental state, and (2) difficulties in satisfying the libidinal needs at the more mature level. Frequently in the psychoanalytical literature development has been viewed as a steadily progressing libido and regression as the turning back of this flow of the libido after meeting an obstacle. A diagram by Korzybski (44, p. 495, taken from Jelliffe) presents this view (Figure 1). We would like to discuss this representation more in detail with the purpose of clarifying the concept of regression. The necessity of such conceptual refinement was stressed by Freud and it still seems to be needed (64).

The problems of development and of regression have their scientific place at a particular intersection of historical and dynamical problems. They point on the one hand to a unique sequence of experiences, situations, personality structures, and styles of behavior, during the history of the individual. On the other hand they point to the dynamics and laws which govern

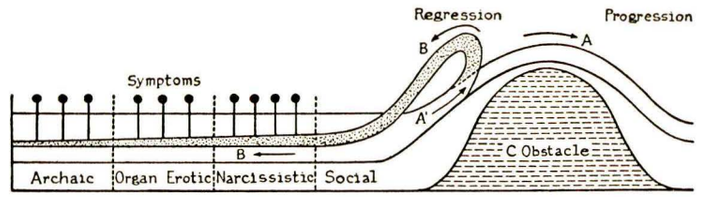


FIGURE 1. Psychoanalytical Representation of Regression

Reprinted with the permission of the publishers from Korzybski, Alfred: Science and Sanity: An introduction to non-aristotelian systems and general semantics. Lancaster, Pa.: The International Non-Aristotelian Library Publishing Co. [c. 1933] Pp. xx, 798.

the behavior in any one of these stages and the transition from one stage to another. The combination of both types of questions within the problem of development or regression is entirely legitimate and necessary. However, it is important to clarify the nature of both problems and their relations.

Abraham uses the following table showing the stages of libidinal organization, stages in development of object love, and dominant point of fixation (taken from Fenichel (18, p. 379)).

Stages of Libidinal Organization		Stages of Development of Object Love	Dominant Point of Fixation in
I. Early oral (sucking)		Autoeroticism (no object) (pre-ambivalent)	Various types of schizophrenia (stupor)
II. Late oral sadistic (cannibalistic)	Ambivalent	Narcissism; total incorporation of object	Manic-depressive
III. Early anal sadistic	Ambivalent	Partial love with incorporation	Paranoia, paranoid
IV. Late anal sadistic	Ambivalent	Partial love	Compulsion neurosis
V. Early genital (phallic)	Ambivalent	Object love with exclusion of genital	Hysteria
VI. Final genital		Object love (post ambivalent)	Normality

Homburger (33, p. 176) has given a more complete picture of the possible stages of the libido. Such tables characterize what one

might call particular styles of behavior and arrange them in a certain order. The person in an early anal sadistic stage is said to show certain dominant goals, and ways of treating others and himself which are characteristically different from the styles of behavior at other stages. The psychoanalytical theory of development states then that normal development is characterized by a certain order in which styles of behavior follow each other in the life history of an individual. Similarly the concept of regression is based on equalities or similarities between certain styles of behavior; for instance, the behavior of the paranoid is said to resemble that of the early anal sadistic stage.

If one were to represent such a life history diagrammatically, one of the co-ordinates of the diagram would have to represent time (age of individual). The second axis would represent the developmental stage. The actual life history, i. e., the velocity of development and the time and amount of regression could then be indicated by a curve such as that given in Figure 2. The difference between this representation and that of the life history in Figure 1 may appear slight. Actually the difference is methodologically rather important. In Figure 1 the libido is represented as "a turning back," like a river or, as Freud says, as a wanderer in new regions who falls back to earlier camps when he encounters

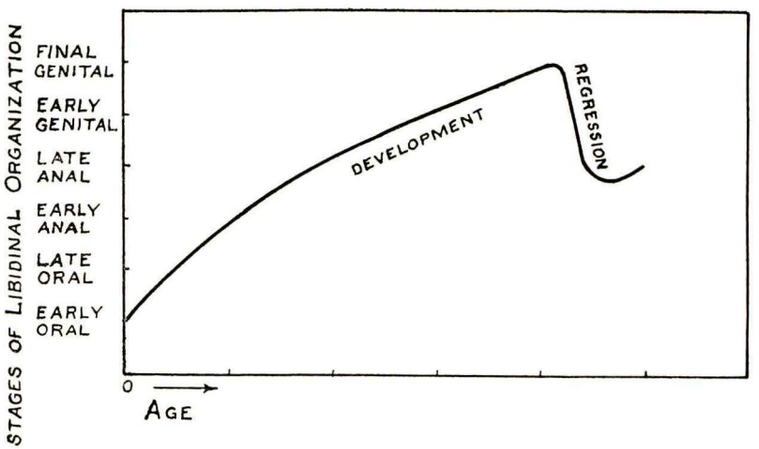


FIGURE 2. Stages of Libidinal Organization
Schematic representation of regression by means of a system of co-ordinates.

obstacles. The curve representing progress and regression in Figure 2 never could "turn back" to a previous point, because time never turns back, and therefore any curve representing a life history must steadily increase within the time dimension. The curve in Figure 2 connects points in an abstract system of co-ordinates (one of which means time) expressing relations of similarity and dissimilarity. It legitimately describes the historical sequence in the style of the behavior of the individual.[1]

However, it does not represent the concrete situation (person and environment) which determines the behavior in any one period, nor the conditions existing at the time when the regression occurs. This may suffice to make clear that Figure 2 does not refer to concrete geographical or psychological settings. The different styles of behavior existing at different times in the history of an individual cannot be treated as parts of one field of co-existing areas in which one can move about, i.e., not as a life space, because a field is a dynamic unity existing at one time.

Figure 1 would be correct if it were limited to a diagrammatic description of the type given in Figure 2. However, it represents in addition the conditions of regression at a certain moment, namely, the fact that the libido encounters an unsurmountable obstacle.

Freud approaches a field theory of regression when he states that regression is at least partly due to the inability of the libido to gain sufficient satisfaction at a more mature level. This assumption might be called a "substitute theory of regression." If one refers to the individual himself instead of his libido one can represent the situation which is said to underlie the turning back of the libido by a simple topological diagram (Figure 3a). The person P tries to reach a goal G corresponding to a need which is characteristic for a certain level of maturity. This region G is at present not accessible to the individual. In other words, there exists a barrier B separating P from G. Under this condition the person turns (according to the substitute theory of regression) to another region G^1 which corresponds to a less mature level, because the activity G^1 seems to promise at least some satisfaction

[1] If one uses Homburger's classification (33) of developmental stages, a system of at least three dimensions would be required because the system has to have as many co-ordinates as qualities are distinguished in addition to the co-ordinate representing time. We have to deal here with an abstract system of co-ordinates similar to the "phase-space" in physics.

to the need. According to this theory regression presupposes a giving up of the attempt to overcome the barrier. Some psychoanalysts have emphasized this aspect and have called almost any kind of withdrawal from a real obstacle regression, particularly so if the person leaves the level of reality and withdraws into sickness, fantasy, or irreality. At the moment it is not important

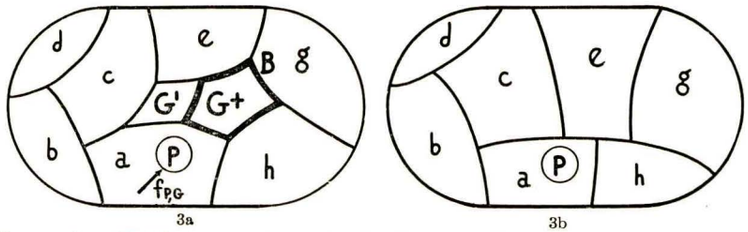


FIGURE 3a. Field Representing the Conditions of Regression (According to Freud's Substitute Theory of Regression)

P=person; G=original goal; G'=substitute goal to which the subject regresses; B=obstacle between P and G (barrier); a, b, c, . . . regions of the life space; $f_{P,G}$=force in the direction of the goal.

FIGURE 3b. The Same Life Space without the Inaccessible Goal (See p. 58)

P=person; a, b, c, . . . regions of the life space.

to discuss whether this theory is right or wrong. It will suffice to say that this is essentially a field theory. It is an attempt to characterize the situation at a given time and to make the topology of the life space and certain dynamic properties of its regions (attractiveness, barrier, etc.) responsible for a certain event.

In summarizing we may state: The problem of regression, like that of development, includes an historical aspect which refers to the sequence of styles of behavior in the life history, and a systematic aspect which refers to the conditions of the change occurring at a given time. Both questions are entirely legitimate and are necessarily dealt with in a psychological approach to regression. Both questions can be represented diagrammatically.

The systematic question concerning the condition of a change which occurs at a given time has to be answered partly by referring to the structure and dynamic properties of the field (life space) existing at that time. The life history can be represented by a sequence of such fields, each of which would characterize the situation at a given historical stage. However, it would destroy the meaning of the field to treat the life spaces of the

newborn, of the three-, six-, and sixty-year-old person together as one dynamic unity.

When a life history is represented by one diagram we have to deal with a system of co-ordinates, one of which refers to time, each of the others referring to quality of the style of behavior (or the state of the person). To describe an aspect of the life history by a curve linking certain points in an abstract system of co-ordinates is rather common in psychology and is of course fully legitimate; any curve representing bodily growth is an example. However, it should be clearly distinguished from a field of co-existing and dynamically related facts, which represents the conditions for the change at a given time. The mixing up of historical and systematical questions, e.g., questions of origin and of conditions, of which Figure 1 is a typical example, has to be avoided both in diagrams and, what is more important, in thinking, if the psychology of development and regression is to make satisfactory progress.

Regression and Retrogression

The question of the particular character of the substitute activity, G^1 (Figure 3a), in cases of regression is answered in psychoanalysis by referring to the history of the individual. The character of G^1 is said to be determined by the kind and degree of fixation at a previous stage of development. Such a statement is logically entirely legitimate from the point of view of field theory, although it has to be specified how the present life space is affected by the fixation which happened many years ago.

This theory of the form and degree of regression touches a second conceptual aspect of the problem of regression which needs clarification.

McDougall has given a detailed account of several cases of regression from shell-shock. He describes the primitive child-like behavior of the persons and the process of recovery. McDougall expresses a certain amount of agreement with the Freudian theory but stresses two rather important points (60).

1. He emphasizes that the regressed behavior does not need to be identical with the behavior which this individual has shown previously. Rather the regressed person shows a primitive but new kind of behavior.

2. He considers regression to be of a less "purposive" character than it appears to be in the Freudian theory.

The possibility of a new kind of behavior occurring in regression (see also Cameron (11) and Lewin (50)) makes it necessary to distinguish two types of changes:

1. The return to a type of behavior characteristic of a previous stage of the life history of the individual. Such a change may be called "retrogression."

2. A change to a more primitive behavior, regardless of whether such behavior has actually occurred within the life history of the individual. Such a change may be called "regression."

It is frequently true that retrogression will also have the character of regression, and vice versa. However, this does not need to be the case. For instance, a child who has shown primitive behavior during a sickness will, upon recovery return to the more mature behavior which characterized him before his sickness. One will have to call such a change a retrogression, although it cannot possibly be called a regression.

Clear distinction between retrogression and regression has become particularly important in view of recent experimental studies with animals (63, 46). These studies show that animals under certain conditions, for instance after a shock, may abandon a newly learned behavior and return to older habits. As far as we can see, none of these studies can be said to have proved that the older mode of behavior was actually more primitive than the newly learned one. Before this is done we would classify these studies as experiments in retrogression rather than in regression.[2]

[2] Mowrer (64, p. 70) discusses a statement by Lewin (52, p. 202-211) that regression would be possible even if a person "were created as an adult Golem." In Mowrer's opinion, the study of Cameron on schizophrenic human adults "agrees with Lewin's re-definition of regression in a-historical terms, but Lewin's views in this connection are not supported by the main body of clinical observation, nor by the findings of the present, admittedly analogical investigation."

There must exist a slight misunderstanding which we would be glad to see cleared up. The distinction between the concepts regression and retrogression has two sides:

1. It implies a statement of a logical (conceptual) necessity to distinguish historical and a-historical problems (aspects of facts) in order to set forth a scientific theory of development or regression. A criticism of such a statement could either be done on logical (conceptual) grounds or on the ground that this conceptual distinction is of no practical consequence. There is, as far as we can see, no point to the argument that this view is "not supported by the main body of clinical observation." Because this would only mean that the observed cases were cases both of retrogression and regression. To be valid as an argument one would have to state that there can be no case of regression without (an equivalent amount of) retrogression and no retrogression without (an equivalent amount of) regression. We suppose Mowrer would agree that such a statement would be incorrect.

2. The other aspect is one of terminology. It is hard to find a terminology which pleases everyone. When this study was started (1935) we decided after much hesitation to use retrogression and regression as indicated. At that time the field was rather new experimentally. The psychoanalytical studies when using the term regression refer usually to both the historical and the a-historical aspect perhaps emphasizing primitivation slightly more, i.e., the a-historical aspect. The recent experimental approaches also refer to both aspects. We have, therefore, not changed our terminology. It seems to be desirable to come to a general agreement on this terminology question.

We can express the difference between the concepts regression and retrogression by the following definitions.

B^{t1}, B^{t2}, B^{t3} . . . may indicate the behavior of an individual or his state (in psychologically equivalent situations) at the time $t1$, $t2$, $t3$ . . .

Definition of Retrogression.—We speak of retrogression if $B^{t2} \neq B^{t1}$ but $B^{t3} = B^{t1}$. Retrogression refers merely to differences and similarities in the time sequence without involving statements concerning "primitivity," "adaptability," etc.

Definition of Regression.—We speak of regression if B^{t3} is more "primitive" than B^{t2}. This does not presuppose that $B^{t3} = B^{t1}$.

Of course one will have to discuss the definition of "primitivation" and the symptoms that can be used as its indication. It will hardly suffice to point to such vague criteria as the "less adaptive" character of behavior, particularly in view of the fact that the regression itself is frequently viewed as an attempt of the individual to adapt himself to a certain situation. The answer can be found partly in the studies in psychopathology. These suggest that there is a change from "a differentiated and pregnant pattern to a more amorphous behavior" (25, p. 31). A complicated hierarchical order within an action changes to a simple organization or to disorganization (11), from an abstract to a more concrete type of thinking (24, 79), from reasoning to learning (62, 39, 47), from flexible to stereotyped behavior (24,

39, 46). Primitivation is a change in the structure of behavior which in some respects seems to resemble the morphological dedifferentiation observable in certain primitive animals, e.g., under certain conditions of malnutrition (20).

Studies such as these go quite far in circumscribing more specifically what is meant by primitivation. However, they still do not seem to supply an operational definition of regression through empirically testable symptoms which is sufficiently general, and at the same time sufficiently definite, for experimental procedures. For the purpose of this investigation we will understand under regression a change of behavior from a kind typical for older normal children to that typical for younger normal children (in an equivalent psychological situation). Such an operational definition is necessarily limited to the age range before maturity, because a change from adult to senile behavior has to be regarded as regression but not as progressive development. However, within these limits it provides a definite and testable criterion for regression. Until the theory of regression is considerably more advanced it might be well to use this criterion as an operational definition.[3]

Such an operational definition evidently provides the possi

[3] One will note that this operational definition does not refer to any behavior which the individual in question has shown previously in his life history. It refers to the type of behavior which is characteristic of normal children of certain age levels.

This definition is in no sense final; it is a working definition necessitated by the current state of knowledge in the field. It has to be used with caution even within the age range up to maturity because it is at least possible that during certain periods the normal average child may actually become more primitive in one or another function. In the long run, the various developmental levels will have to be defined conceptually in terms of degree of differentiation, organization and similar properties other than age. Eventually the age reference in the operational definition will have to be dropped entirely, and particular changes occurring under various conditions specified. As a matter of fact we have gone beyond our initial definition and attained this level to some degree, as the report of the experiment will show. Nevertheless we have anchored our procedures to this definition, and have gained our initial insights as to what changes to look for by examining the changes which occur in normal development. As long as the concept of regression is used, it is necessary to have some criterion for determining the sequence of states which constitute the scale in respect to which regression occurs. This is supplied by the developmental stages of normal children.

bility of determining the amount of regression and the level to which the person regresses. The latter can be expressed by the age level of normal children for which this behavior is typical. The amount of regression can be characterized by giving the age levels for the state of the individual before and after regression. (Both indications need, of course, more detailed technical specifications. See Chapter II.)

Kinds of Regression

Regression of Behavior and of the Person: Pseudo-Regression.—A girl of two years stands before a mirror making herself small, and tries to find out how she would look if she really were small. The situation in which this behavior occurs is as follows. The girl has a baby brother of whom she is envious. She is obviously trying to make up her mind whether she should try to grow up or grow smaller. Numerous cases exist in which children in such a situation try to imitate their younger siblings and begin to show babylike behavior in their table manners, in their way of crying, or in being naughty, etc.

Is this regression? If we refer only to the face value of this behavior we may have to speak of regression in line with the definition given above. The style of behavior has been lowered from a pattern typical of a three-year level to that of a two-year level. Nevertheless, one hesitates to identify such a change with regression resulting from sickness or acute emotional tension. The girl, showing the behavior of her younger brother, may actually "play a role," although that of a younger child. This role may be played with the skill of a good actor, although not as a play but in earnest. It would probably be fairer to call it refined rather than primitive behavior.

If the child keeps up such a role for a long time he actually may become primitive. He may lose, at least to some degree, his ability to act more mature. Until such a state is reached we may speak of a "pseudo-regression of behavior" without a "regression of the person." In other words, regression of behavior may or may not be a symptom of regression of the person.

Similarities of behavior are not necessarily indications of similarities of the underlying state of the person. That the same state of the person can manifest itself in rather different symptoms has been shown in detail in regard to anger (12) and holds

for all fields of psychology. It follows from the basic formula that the behavior (B) is a function of the person (P) and the environment (E), i.e., $B=F\ (P,E)$. This makes it necessary to distinguish the directly observable "symptoms" (B) from the underlying "state of the person" (P) which methodologically always have the position of a "construct" (78, 50).

In connection with developmental states it means that the maturity level of a person may actually be higher or lower than that indicated by his behavior. The girl mentioned above is an example of the former case. An example of the latter is found in the child who sticks to certain imposed rules in a way which is typical of a greater "maturity of aspiration" (Anderson (5)), and shows in consequence in many respects a more adultlike behavior as a result of firm pressure from the outside; he will behave on a lower maturity level as soon as the pressure is released.

The distinction between regression of behavior and regression of the person is closely related to the necessity of referring to comparable situations if one wishes to use differences of behavior as symptoms for differences in the state of the person.

Temporary and Permanent Regression.—Regression may last only a few minutes, for instance in a case of a slight shock, disturbance, or emotion, or it may last many years, for example as a result of sickness. Regression may be a slow sinking or a sudden drop. The individual may stay regressed, he may slowly or suddenly regain his previous level, or he may return to an intermediate level.

Situational and Established Regression.—Under emotional stress both the behavior and the person may regress to a more primitive level. In such circumstances the individual is actually unable to behave on a higher level. Yet even in this case the primitivation may be confined to a particular situation, such as "being in prison" or "being severely frustrated." As soon as the person leaves this particular situation he may regain his previous level. In other cases the person may regress in such a way that he will not show his previous higher level even in a most favorable situation. The former case we will call *situational* regression, the latter *established* regression. There exist, of course, transitional cases.

It is important not to identify this difference with the distinction between temporary and permanent regression. A permanent regression may result from the fact that the individual is kept permanently within one specific situation; a regression may be relatively permanent and still situational. The terms situational and established regression do not refer to duration. In case of situational regression the developmental level fluctuates greatly with changes in the situation, whereas the established regression is more independent of such changes. This distinction is of practical importance for the diagnosis and treatment of cases, for instance, in social-psychiatric work with children. It is clear that experiments with human beings have to be limited to creating situational regression.

Partial and General Regression.—Regression may affect more or less restricted areas of a person. For example, regression may affect only the motor functions, or the emotional life of a person, without much change in his intellectual capacities. Psychopathology gives many examples of different patterns of regression of specific areas of the person as well as general deterioration. Of course any regression of specific areas does, to some degree, affect all behavior of the individual.

Main Differences in Behavior at Different Age Levels

In order to understand the situations which lead to regression, it will be necessary to develop definite concepts which characterize the behavior and state of the person corresponding to different developmental levels. This should be done in such a way as to permit a logical derivation of statements in regard to forces which change a person from the state corresponding to a higher level to the state corresponding to a lower level. If this task were fulfilled one would have a full theory of regression which would permit predictions about the amount and the kind of regression of a given person under various circumstances.

It is evident that such a goal can be reached only very gradually. We will try first of all to give a survey of what one might call the main aspects of behavior differences at the different age levels. We will then proceed to discuss certain kinds of constructs which may make possible the conceptual representation of the state of the person in such a way that at least some of the be-

havior differences may be understood, and some conditions of regression derived.

The differences of behavior at different age levels may be classed under the following five aspects: variety of behavior, organization of behavior, extension of areas of activity, interdependence of behavior, and degree of realism.

Variety of Behavior

One speaks of the increasing variety of the behavior of a child as he grows older. (This holds true despite the fact that certain types of behavior drop out during development.) The increasing variety of behavior is noticeable in many ways.

a. The *behavior* of the newborn is more or less confined to sleeping, crying, drinking, eliminating, and lying awake. The behavior of the growing child includes increasingly more types of activities: talking, walking, reading, etc. The undifferentiated behavior becomes differentiated by a branching out into a variety of species of action. For instance, an approach to a goal is at first always a direct approach. Later on, indirect ways of approach arise by means of round-about routes and the use of physical and social tools. In addition, the direct approach shows more variety, for instance, in the degree of activeness, the amount of real or gesture-like behavior, etc. (16). The indirect approach becomes differentiated in regard to the kind of physical and social tools used. Similar differentiation can be observed in practically all fields of activities (35). The language of the individual increases in regard to the number of words used, (59, 75, 8) the types of words used, and the grammatical construction. If one regards the activities as possibilities that the individual has, one speaks of an increase in the variety of "skills."

b. A similarly increasing variety can be observed in the field of *emotions* (7, 26, 8). Again, primitive undifferentiated emotional expressions branch out into distinct varieties. At first joy may be difficult to distinguish from a grimace caused by stomach trouble. Later, smiling is something rather distinct in character and unmistakable. Step by step more types of smiles arise, such as friendly open smiles, happy smiles, arrogant smiles, defiant smiles and so on.

c. A similar differentiation can be observed in the field of *needs*, interests and goals. Step by step the few needs of the infant branch out into a greater variety. This increase is very noticeable during childhood. In addition, there occurs a shift in the dominance of certain needs. We will come back to this problem later.

d. The process of differentiation into a great variety is particularly clear in the field of *knowledge*. The comparatively undifferentiated psychological world of the infant widens and structures itself in a process which can be described as differentiation (40). The change in knowledge includes many cognitive changes which are restructurization rather than an increase in varieties of areas. However, one of the predominant characteristics of the change of knowledge with age, both in regard to learning and insight, is its increased differentiation, its greater richness.

e. The *social behavior* and the social relations show an increasing variety. The number of persons with whom social relations exist increases as do the types of social interrelations. The relations to different individuals become more and more articulated as to specific kinds of friendship, dependence or leadership. A clearer distinction is made between superficial and deeper attachments.

On the whole then, we may say that the variety of behavior increases during childhood with normal development. This may be expressed by the formula:

$$(1)\ var\ (B^{Ch}) < var\ (B^{Ad}),$$

where *var* means variety; B^{Ch} behavior of the child; B^{Ad} behavior of the adult. To simplify our formulistic representation and to indicate that we merely wish to characterize the main trends of development, we will refer in the formulae to two levels only indicated as *Ch* and *Ad*.

Organization of Behavior

If development in behavior led merely to an increased variety of behavior, one might expect the conduct of an individual to become more and more chaotic or at least more and more unconnected. This is obviously not the case. Parallel to the increasing differentiation goes a development according to which an increasingly greater variety of parts is included in *one* unit of action. There are a number of ways in which different actions may become parts of a larger unit of action. Frequently the unity of a behavior which is carried through a certain period of time and containing a number of more or less different subparts is characterized by one

leading idea which guides and controls the parts. This leading idea may be a governing purpose or the reaching of a goal. The subparts may be certain preparations, followed by actions which carry the individual to the goal, and finally certain consummatory actions. In this case, some of the subparts of the action have the relation of means to an end. The guiding purpose may be a precise goal, such as scaling a fence, or a more general idea, like playing house. In other cases, for instance, in many recreational or play activities such as reading a book, the various parts have mainly the character of co-ordinated subunits.

In connection with all types of unity in behavior that are due to the guidance or steering of a governing purpose or a leading idea we will speak of the organization of behavior.[4] In these cases one can distinguish at least two levels; the guiding idea and the guided manipulation.

In development one can distinguish three aspects of the organization of behavior.

Complexity of Units.—One can say that the maximum number of subparts and the variety of subparts contained in one unit of action increases with development. Instead of handling two building blocks at a time the child as he grows older uses an increasingly greater number of building blocks in making a primitive pattern. One symptom of the greater complexity is the increasing maximum duration of continuous play with increasing age (10).

Hierarchical Organization.—Aside from the increasing number of manipulations which may be kept together by a guiding idea, the type of organization itself seems to become more and more complicated: a goal which steers a series of manipulations may become the subgoal of a more inclusive goal. The subgoals seem to be governed by the higher goals in much the same fashion as the actual manipulation is governed by the subgoal. For instance, the main idea of playing house may contain a number of subideas; father goes to work, mother dresses the children, does the washing, etc., all established in a certain sequence guided

[4] Frequently the term "integration" is used in this connection. We prefer to speak of organization because mathematically integration is the reverse of differentiation. However, it has been rightly emphasized that psychological "integration" does not mean dedifferentiation. It may be better to replace this term by the term "organization." This use of the term "organization" seems to be well in line with its use in embryology and also in sociology. See Appendix 1.

by the main idea. A subgoal, for instance, dressing the children, may contain dressing Mary and dressing George. In other words, a more inclusive unit of behavior may contain a number of hierarchical levels, each of which is ruled by the next higher level. Referring to the number of levels we will speak of different "degrees of hierarchical organization" of a behavioral unit.

The maximal degree of hierarchical organization seems to increase with age, i.e., one unit can contain more levels in older than in younger children.

Complicated Organization.—An activity guided by one idea may not be carried through as a continuous action but may be interrupted by other activities and later taken up again. To carry through successfully an activity which is to be repeatedly interrupted obviously requires a relatively complicated organization. A second kind of complicated organization exists in case of overlapping behavior, when simultaneously two or more activities which are guided by practically unrelated ideas are carried on. We will discuss an example of such behavior later when we speak of secondary play, i.e., play which occurs simultaneously with other activities, e.g., a conversation with a second person about matters unrelated to the play. Closely related to this is the organization of behavior which has two levels of meaning. Lying (77), joking, showing overfriendly behavior out of hate or similar "perverted expressions" (50) are actions on two levels which may be said to be more or less contradictory. The more overt level frequently serves to cover up the contrary meaning of the deeper level, and indicates a somewhat complicated organization of the action. Obviously, the problem of self-control is closely related to this type of organization.

Lies and jokes are rather early achievements. However, the lying of the two-year-old child is relatively overt and primitive. The ability to exhibit this type of complicated organization seems to increase with age.

It cannot be said that every action of an older child is more highly organized than every action of a younger child. The behavior of an older child frequently includes units which are less complicated than those of younger children. However, the maximum degree of organization of behavioral units seems to increase with age, in other words, we can say:

$$(2)\quad hier\ org^{max}\ (B^{Ch}) < hier\ org^{max}\ (B^{Ad})$$

Hier org^{max} stands for the maximum degree of hierarchical organization; B^{Ch} for the behavioral unit of a child; B^{Ad} for the behavioral unit of an adult.

Extension of the Area of Activities and Interests

The psychological world which affects the behavior of the child seems to extend with age both in regard to the areas and the time span which are taken into consideration.

Scope of the Field.—The three-month-old child living in a crib knows few geographical areas around him and the areas of possible activities are comparatively few. The child of one year is familiar with a much wider geographical area and a wider field of activities. He is likely to know a number of rooms in the house, the garden, and certain streets. Some of these areas are accessible to him, others are not. He may be able to crawl under the table or the couch, but he may not be able to climb on a certain chair although he would like to do so. Such areas of his life space lie outside his space of free movement (50), which is limited partly by his own ability and partly by social taboos. The child may, for instance, like to tear books. In this case tearing books is an area in his life space and may influence his behavior considerably. This is true even though the "no" of the mother keeps the child outside this area of activity. The discrepancy between the attractive areas of the life space and the space of free movement is one of the dominant factors determining the level of aspiration (50) of an individual.

During development, both the space of free movement and the life space usually increase. The area of activity accessible to the growing child is extended because his own ability increases, and it is probable that social restrictions are removed more rapidly than they are erected as age increases, at least beyond the infant period. Certain events, like the arrival of a younger sibling, may well reverse the balance of change at a given period. However, even at times when the space of free movement is not increasing, the life space usually extends with age into new, partly accessible, partly inaccessible regions. The widening of the scope of the life space occurs sometimes gradually, sometimes in rather abrupt steps. The latter is characteristic for so-called crises in development. This process continues well into adulthood (10).

Time Perspective.—A similar extension of the life space during development occurs in what may be called the "psychological time dimension." Behavior occurring at a given time is influenced not only by what the individual experiences as his psychological present, but also by his expectations, wishes and fears for the future and by his knowledge of his past. The psychological present, psychological past, and psychological future are essential parts of the life space of the individual at a given time (21, 54, 15). During development the scope of the psychological time dimension of the life space increases from hours to days, months, and years. In other words, the young child lives in the immediate present; with increasing age an increasingly more distant psychological past and future affect present behavior. L. K. Frank (21) has correctly emphasized that the relative importance which the past and the future have for the individual changes considerably during development and shows great individual differences. We will not, however, discuss this rather important question here.

It may be possible to interpret the increasing extension of the life space merely as the combination of an increasing variety of behavior and of different types of organization of behavior. However, we prefer to express this change in a separate statement:

$$(3) \quad L\,Sp\,(Ch) < L\,Sp\,(Ad)$$

where $L\ Sp\ (Ch)$ means the size of the life space of the child; and $L\ Sp\ (Ad)$ the size of the life space of the adult.

Also, for the space of free movement (i.e., the totality of accessible regions within the life space) it holds on the average that:

$$(4) \quad SFM\,(Ch) < SFM\,(Ad)$$

where $SFM\ (Ch)$ means the size of the space of free movement of the child and $SFM\ (Ad)$ the size of the space of free movement of the adult. However, the space of free movement may be narrowed down during certain developmental periods, as for instance, when a child is subjected to a rigid regime.

Interdependence of Behavior

The statement that the individual becomes increasingly differentiated can have two meanings. It can mean that the variety of behavior increases, i.e., that the totality of behavior observable

at a given age becomes less homogeneous. In this case, the term differentiation refers to relations of similarity and dissimilarity; it means "specialization" or "individualization." On the other hand, the term differentiation can refer to relations of dependence and independence between parts of a dynamic whole. In this case increasing differentiation means that the number of parts of the person which can function relatively independently increases; i.e., that their degree of independence increases.[5] We have already discussed the increasing variety of behavior, we will now turn to the questions of dependence and independence.

The statement that the child shows a greater unity than the adult has been emphasized in psychology relatively recently. Previously, it was customary to consider that the adult exhibited the greater unity, because in childhood, different needs and different areas of activity may develop more or less independently. The adult on the other hand is more likely to have these different areas of activity integrated.

Today it is generally acknowledged that the development of the child includes an increase both in differentiation and in integration. Development seems to increase the number of relatively independent subparts of the person and their degree of independence, thus decreasing the degree of unity of the individual. On the other hand, development involves integration which increases the unity of the person. As both of these processes advance at the same time, obviously, integration cannot be a process which is actually the reversal of differentiation. It does not eliminate differentiation, and it is not dedifferentiation. But, integration presupposes differentiation. To avoid misunderstandings, we prefer, therefore, to use the term "organization" instead of integration.

The kind of functional interdependence which underlies the degree of organizational unity of a person must be different obviously from that kind of interdependence which underlies the degree of his differentiation. Concepts dealing with interdependence are typical for the level of constructs, and any attempt

[5] In morphology the term "differentiation" is limited to cases where the parts become not only more independent but also different from each other. It would be advisable to use two different terms for the two concepts of differentiation. We shall speak of "specification" or "individualization" in case of increasing dissimilarity, of "differentiation" in referring to increasing independence.

to determine more precisely the different types of interdependence presupposes a discussion of a number of constructs. We will approach them after surveying the empirical data referring to the individual's increasing differentiation on the one hand and his increasing organization on the other.

Decrease of Simple Interdependence.—We start with those facts which indicate the increasing differentiation of the person.

Differentiation of the Motor Systems: The so-called mass action of the foetus and infant is a characteristic example of the undifferentiated reaction of the individual with his whole body rather than with certain limbs. The development of the child is characterized by an increasing differentiation of the motor functions, indicated by the increasing extent to which the different parts exhibit relatively independent actions. The development of grasping for example, (30) starts with a tendency to approach the object simultaneously with eyes, legs, arms, mouth. Gradually, the other activities drop out and the child comes to use first his arms and his hands as relatively undifferentiated units and finally his fingers independently. It is probably fair to say that a young child shows a tendency to do everything with his whole body to a greater degree than an older child. The gradual decrease of the so-called involuntary accompanying movements is but another expression of the same fact. In a child the increase of tonus in one part of the muscular system is more likely to be accompanied by tonus in other parts than in an adult (4). In other words, the motor system shows an increasing differentiation as regards muscular tension.

Interdependence of Inner Personal and Motor Regions: A similar decrease in degree of interdependence can be observed in the way needs or emotions express themselves. The amount of muscular activity in the infant is a direct function of its hunger (36). It is probably true that for older children and adults a similar relation exists between hunger and amount of restlessness, fighting and other emotional expressions. However, this dependence is less direct. The satiated infant is whole-heartedly satiated; he is drunk; his body expresses his state in every aspect, and he is helpless against its expression. The older child is more self-controlled. His motor system does not show as openly his needs and his emotional state. In other words, with increasing age there is less direct interdependence between the motor sytems and the "inner personal systems" (50) i. e., those regions of the person which are related to his needs.

The decrease in direct dependence between these two sections of the person is apparent, also, in the effect which the state of the motor system has upon the inner personal region. With the younger child the mood and practically every sector of behavior depends more directly on bodily state, e. g., fatigue, hunger, upset stomach, etc., than with the older children.

Interdependence Within the Inner Personal Regions: Certain facts indicate that the various needs may become less directly interdependent

also. The cosatiation (37) of one need through the satiation of another decreases with age (45). Experiments on substitute value (74) indicate that the satisfaction of one need is more likely to bring about a general state of satisfaction in younger than in older children. For older individuals the state of tension of the various needs is independent to a higher degree.

Interdependence of Person and Environment: The very young child is helplessly exposed to the stimuli of the momentary situation. The older child can more easily place himself above the situation. This difference has been found to be essential for the conduct of infants and older children in a conflict situation (16). It is partly the result of the change in time perspective, but it indicates also a greater "functional distance" between the "ego" and the psychological environment. Spencer (76, p. 316) and more recently Piaget (69, p. 360) have discussed this greater remoteness or greater "distance" between the central ego of the person and the environment (see also 3, 31). The growing child becomes differentiated into an increasing number of more central and more peripheral layers. It is also true that the "superficial" aspects of things and events in the perceived environment become increasingly distinguished from their "deeper" meaning.

The greater distance between the central layer of the ego and the psychological environment involves a greater independence, or at least a less direct interdependence between these areas of the life space, namely the psychological person and the psychological environment. It makes the child less helpless against the immediate influences of his environment, and makes the perceived environment less dependent on the mood and the momentary state of the needs of the child. We know that the adult will perceive a given physical setting as a different psychological environment if his needs, fears, wishes, etc. change (67). However, the dependence of the perceived environment on the needs and fears of the individual is probably more complete and more immediate in the child. Fantasy and reality, lies and truths, seem to be more interwoven in the child than in the adult and more so in a younger child than in an older one (74, 49).

On the whole, then, there are a great number of facts which indicate that development brings about a differentiation within the life space of an individual so that certain parts of it become less directly interdependent. This decrease in direct interdependence is observable within the motor system of the individual, within his inner personal regions, in the relation between the inner personal and the motor regions, and finally in the relation between the inner psychological regions and the psychological environment. We may express this observation by the formula:

$$(5) \quad si\ uni\ (Ch) > si\ uni\ (Ad)$$

si uni (*Ch*) means the degree of unity of the child as indicated by

the degree of simple interdependence of certain subparts of the child's life space and *si uni* (*Ad*) means the degree of unity of the adult as indicated by the degree of simple interdependence of the equivalent subparts of the life space of the adult.

In addition we can state

$$(5a) \quad dif\ (Ch) < dif\ (Ad)$$

where *dif* (*Ch*) and *dif* (*Ad*) mean the degree of differentiation of the child and of the adult (See Appendix 1).

Change in Organizational Interdependence.—The increasing differentiation of the life space into relatively separated subparts is somehow counteracted by the increasing organization of the life space. There is a wealth of material which indicates this increasing organization with age. It refers to the increasing scope of co-existing parts of the life space which can be organized as a unit and the increasingly larger sequence of actions which are unitedly governed. The latter point has already been discussed.

Organization of the Motor Systems: Psychologists have collected a great number of data which reveal the increasing organization of the motor functions in development. For example the child's postural control of his head, and his learning to sit and to stand; the stages of the development of locomotion, such as creeping, walking, climbing, running, jumping; the development of speech; and the control of elimination can all be viewed as examples of the increasing organization of the various parts of the motor system for unified action. (See survey in Brooks (8, p. 137-152)). The organization of different muscular systems into constellations, and of the constellations into sequences of constellations both show an increase to more and more complicated types. The precision of motor organization is indicated by the increasing accuracy of voluntary movements (80, 9) (See Brooks (8, p. 160, 161)). Talking presupposes the organization of highly complicated sequences of muscular constellations.

Organization of the Motor System by the Inner Personal Regions: The relation between the inner personal and the motor regions acquires increasingly the character of an organization in which the motor functions take the place of a tool. Lewin (53) uses the following illustration for this change. A young child who wishes to perform a manipulation, for instance, threading a needle, is likely to get muscularly more tense the more eager he is to succeed, even if the task is of such a nature that the muscles have to be relatively relaxed if the task is to be carried out. In other words, in a young child a greater inner personal need tension is likely to lead to a higher muscular tonus. This is in line with the direct, simple interdependence of the inner personal and motor systems discussed previously.

If the unorganized "spreading of tension" from the inner personal to the motor regions becomes too dominant, it necessarily blocks any

orderly purposeful muscular action. In the "organized" dependence of the motor functions upon the inner personal regions there is not a general increase in tonus, but rather sequences of relaxation and tonus in certain groups of muscles occur and are steered in such a way that the pattern of action and the intensity of tonus is adequate for reaching the objective in the given setting. This presupposes, that the pattern and intensity of muscular tonus is independent of the intensity of the tension corresponding to the need behind the action. For threading a needle, the muscles have to be relatively relaxed, even if the person is most eager to hurry; for carrying a heavy load the tonus has to be high, even if the need for doing this work is small. With increasing age the organized interdependence seems to gain in strength relative to the simple interdependence; and the position of the motoric system as a tool, becomes more firmly established.

Organization of the Inner Personal Regions: In discussing the increasing differentiation of inner personal regions, we dealt with the simple interdependence of needs, i. e., the spreading of tension. The effect of the tension within one need system upon the general tension level of the need systems of an individual (6), can be understood as such a spreading. The process of cosatiation of one need by the satiation of another need (37) seems also to have the characteristics of spreading.

It seems, however, that a second type of interdependence between inner personal regions exists which has the characteristics of an organizational interdependence: one system may hold the position of a governing need, the other the position of a governed need. An individual may for instance show a great desire to join an art school. This need may be derived from and be governed by the need for doing art work. The need to enter the art school may in turn create and regulate a need for fulfilling certain requirements, such as, preparing for an entrance examination; and this, in turn, the *quasi* need (49) to buy a certain book in a certain store. In other words, there may exist a hierarchy of needs so that a more dominant need rules one or more subordinate needs which in turn dominate subordinate needs at the next lower level.

Frequently the dominated need is set up by a combination of more than one governing need. For instance, the need to enter art school may have its historical source in the need for doing art work and in the additional need to earning a living for which the school work seems to be a preparation. The derived need to enter art school may become more or less autonomous (3), that is, more or less independent of the needs to which it can be traced. We wish to stress here that the attempt to secure the satisfaction of one or more source needs in a given environmental situation may give rise to a dependent need. This type of dependence does not involve spreading of tension, but here one need is governed by another, one need is a tool of another. In other words, this is an organizational dependence similar to that between the motor systems and the inner personal regions. The hierarchy of organizational interdependence between needs seems to increase during development.

Organization of the Psychological Environment: The increasing organization of the psychological environment by the individual does not need much illustration. Simple examples of such an organization are the use of some parts of the environment as tools. The growing child becomes increasingly more able to organize parts of his physical and of his social environment in this way, and this organization becomes increasingly complicated, particularly in the social field. The approach to a goal by way of round-about routes, instead of by direct action, also exemplifies the ability of the child to organize intelligently his actions in relation to an increasingly greater scope of his psychological environment. Such organization presupposes a decrease in the simple dependence of the person upon his immediate surroundings which we have discussed (p. 22). For satisfying his needs the infant depends mainly on the circumstances which arise. Actually he would die if these occasions were not provided by a grownup. The growing child tries increasingly to organize his environment so that the satisfaction of his needs is not left to chance. In other words, the life space containing the psychological person and his environment tends to become a more highly organized unit. Such an organization is frequently facilitated by certain ideologies and rationalizations which bring certain otherwise contradictory facts and needs into psychological harmony with each other.

On the whole, then, the hierarchical organization of the life space increases with age. Such an increase can be observed within the motor system, within the inner psychological regions, in the relation of the motor to the inner psychological regions, and in the relation of the psychological environment to the inner personal regions. We can express this change through the formula:

$$(\mathbf{6}) \quad hier\ org\ (Ch) < hier\ org\ (Ad)$$

where *hier org* (*Ch*) means the degree of hierarchical organization of parts of the child's life space, and (*Ad*) refers to the life space of the adult. Formula (**6**) is closely related to (**2**). The latter refers to the hierarchical organization of the single unit of behavior, the former to the hierarchical organization of the individual as a whole.

That the number of hierarchical strata increases during development does not necessarily mean a steady increase in the unity of the person. The older child does not always show a more harmonious personality or a personality more strictly governed by one center. As we will see (Appendix I, p. 258-261), one has, rather, to expect ups and downs in the degree of unity of the person, whereby differentiation tends to decrease the unity

increasing "distance" between the ego and the environment, and the increasing hierarchical organization. However we probably have to deal here with a somewhat different dimension of change, namely, an increasing crystallization of an objective world within the life space and an increasing tendency to be realistic. The world of an insane person may be as highly differentiated and organized as that of a normal person but may lack the realism of the latter.

Piaget (69) has discussed in detail the growing realism of the child's world as shown in his various stages of thinking. A somewhat parallel process in the field of action shows one of the outstanding differences between a child's and an adult's behavior to be that the child does not "economize" his action to the same degree. To be efficient, striving to obtain a maximum result with a minimum effort, is an attitude typical of the older individual. We have to deal here with a specific organization in reference to the properties of the objective world.

One can express this change by the formula:

$$(9) \quad real\ (Ch) < real\ (Ad)$$

where *real* (*Ch*) means the degree of realism of the child and *real* (*Ad*) the degree of realism of the adult. However, we are aware that children are frequently more realistic than adults in some respects, for instance, they may be less blinded by ideologies. The statement (9) therefore is made very tentatively, with the intention mainly of pointing to an important aspect of development. It needs specification (See p. 30).

As main differences in the behavior of the child of different age levels, we have mentioned changes in the variety of behavior, in the organization of behavior, in the extension of the life space, in the unity of the person, and in the degree of realism. We do not, however, mean to suggest that these are the only behavioral changes typical of development.

Behavioral Aspects of Regression

We have defined regression as a change in a direction opposite to the changes characteristic of development. It follows that changes which are the reverse of those we have enumerated as typical for development should be typical for regression. One can ask whether this conclusion from our definition of regression and description of development is in line with the actual use of the term regression. We will see that this is the case in most, although not in all instances.

1. If the *variety* of a person's behavior or the richness of his actions, decreases considerably, one speaks of primitivation in the meaning of simplification.

2. A decrease in the degree of *organization of a behavioral unit* may mean either a decrease in the number of hierarchical levels or a disorganization. In the latter case, the parts of the action may be contradictory. In both cases the breakdown of the organization is likely to be viewed as a primitivation, as regression of behavior.

3. The same holds true for a *dedifferentiation and for a decrease of organization of the person* i. e., those factors which are related to the unity of the person. A decrease in organization of the person, or a change from a unity based on organization toward a unity based on simple interdependence (spreading of tension) is most common in those cases where one speaks about primitivation of the person. They are typical for the temporary regression observed in strong emotionality and for most of the psychopathological cases of regression.

4. The decrease in the extension of the *area of activities and interest* seems to be characteristic for those cases of regression which come up, for instance, as a result of long unemployment (according to a report given in a lecture by Oeser). The unemployed man and even his children have been observed to narrow their field of activities far more than economic necessities require. Their time perspective seems to shrink so that the behavior of the person is more dependent upon the immediate situation. The shrinkage of the fantasy life seems to indicate a contraction in the reality-irreality dimension of the life space. Such a change of the life space, opposite to the extension during development, certainly represents a primitivation and regression.

We have mentioned that not only the life space as a whole, but also that part of the life space which is called the *space of free movement* usually increases during development. The space of free movement might narrow down without immediate change in the extension of the life space. This may happen when a person falls sick, or is placed in prison, or when a new sibling arrives. Such a change in the proportion of the accessible to the inaccessible areas in the life space is commonly called restriction but not regression. It might be appropriate to speak of regression only in those cases where the scope of the life space as a whole decreases. We have mentioned that this frequently happens if a decisive diminishing of the space of free movement is established for a sufficiently long time.

5. The outstanding example of a *decreasing realism* is the shift from sanity to insanity. A temporary and comparatively slight change in this direction is the "blindness" to reality, typical of high degrees of emotion. Usually, also the "economy of action" breaks down in an emo-

tional situation: the individual "explodes" without much concern for the efficiency and adequacy of his behavior as a means to an end.

Such decrease in realism is frequently called primitivation. Certain authors (81) seem to regard a "withdrawal from reality" as the most outstanding characteristic of regression. However, an older child may well develop elaborate fantasies without this being a symptom of primitivation. On the contrary, the older child usually has a more developed fantasy life than the younger one. Thus, a more elaborate fantasy life has generally to be considered as a symptom of differentiation, rather than of primitivity.

It seems, therefore, necessary to consider carefully the circumstances of unrealistic behavior before it is evaluated as a symptom of regression. Maybe what counts is not the actual degree of realism of behavior, but, the inability to be more realistic. That would mean, that instead of formula (9) the following formula applies:

$$(9a) \quad real^{max}\,(Ch) < real^{max}\,(Ad)$$

$real^{max}(Ch)$ indicates the maximum degree of realism which the child is able to show, and this should be considered the basis for judgments of the developmental level. We do not need to discuss this question further here.

The different aspects of regression, such as the decrease in variety of behavior and in organization of behavioral units, change in unity of the person, shrinking of the life space, and decreasing realism are not linked rigidly so that a certain amount of regression in one aspect always leads to a definite amount of regression in every other aspect. The various patterns of regression observable in cases of emotion, bodily and mental diseases, imprisonment or senility, strongly indicate that the different aspects of regression are, to a certain degree, independent of each other. On the other hand, there seems to exist some degree of interdependence so that an individual who is regressed below a certain level in one respect, cannot keep his previous developmental level in regard to the other aspects.

The Representation of Developmental Levels by Means of Scientific Constructs

We have discussed some of the main behavioral properties of developmental levels. To be able to predict regression, or set forth a scientific theory of regression, one will have to characterize the different developmental levels of a person in such a way that

the conditions of regression can be logically derived. Such a scientific representation of different developmental stages should also make understandable the manner in which the various characteristics of a given stage, such as variety and organization of behavior, unity of the life space, etc., are interrelated.

The psychological constructs which may be useful for such a task do not need to be invented *de noveau*. A number of concepts (for example, differentiation) are used by practically everyone working in this field. What is needed, above all, is a conceptual clarification of these constructs.

We will not discuss these matters in detail here, but only sufficiently to make understandable the prediction on which the following experiments are based, and to provide the conceptual background for later theoretical considerations. As many of these conceptual problems are highly technical in nature, the discussion of details is placed in Appendix 1.

If the conceptual representation of developmental stages is to facilitate the derivation of the conditions of regression, it will have to be done in terms which include person and environment; in other words, in terms of a field theory.

The Degree of Differentiation of a Dynamic Whole

We will begin with the concept of differentiation. As mentioned above, the term differentiation refers either to the variety of behavior or to a dynamic construct, namely to the degree of differentiation of the person, for which the variety of behavior is commonly said to be a symptom. We will have to consider whether this construct, i.e., this state of the person can be represented in a conceptually more precise form.

General Characteristics of the Concept of Differentiation.— Differentiation refers to the Number of Parts of a Whole: It expresses a certain characteristic of a dynamic whole, i.e., it refers to the number of relatively separated or distinguishable parts contained in a definite whole and, perhaps, to the degree of separation of these parts. The mitosis of the egg into two, four, and eight cells, or the later differentiation of the embryo into ectoderm, mesoderm, and endoderm are simple examples of a differentiation which can be determined morphologically.

Differentiation Based on Independence of Parts: Unfor-

tunately, the psychological degree of differentiation of a person cannot be determined morphologically. In psychology, the distinction of parts within the person will have to be done on the basis of a functional separation of these parts.

How, on the basis of functional independence, a part may be defined within a whole, and how the number of such parts contained in a whole may be determined, so that one can speak of a definite degree of differentiation of a whole, is the task which confronts us.

Differentiation as Related to Simple Interdependence Rather than to Organizational Interdependence: The degree of functional differentiation which is to be attributed to a given whole depends upon the type and degree of independence which is being considered.

We will distinguish here but two types of interdependence of parts in a whole (See Appendix 1).

1. One type of dependence, which has been called *simple dependence* has the following characteristics. First, it is based on a process which has the character of "spreading" from one part to neighboring regions according to proximity. Second, the change of the dependent part usually occurs in the direction of equalizing its state and the state of the influencing part. For instance, spreading of tension means that neighboring parts tend to change so that a state of equal tension is approached in all parts. Third, the dependence of part *a* on part *b* is essentially of the same type (although not necessarily of the same degree) as the dependence of part *b* on part *a*.

2. The dependence which has been called *organizational interdependence* shows rather different characteristics. First, it is a type of dependence between *a* and *b* similar to that between leader and led, or between someone using a tool and the tool. In such a case, the way *a* depends upon *b* is obviously rather different from the way *b* depends on *a*. Second, the organizational dependence usually does not work from neighbor to neighbor like the spreading of tension. It is a selective process: sometimes one part, sometimes another part of the system is used as a tool in a specific way. For instance, the same need may produce an organized activity in different parts of the muscular system. Third, the kind of change resulting from the organized interdependence of *a* and *b* usually does not tend to equalize the state of *a* and *b*. The subordinate part *b* (i. e., the part which is led, the tool) changes in a way which helps *a* (the leading part) to reach its objective, but it does not lead to greater final equality between the two.

When we speak of the degree of differentiation of the person,

we will refer only to the first type of dependence, i.e., the one based on simple interdependence.[6]

Determining the Number of Cells in a Dynamic Whole.—Definition of the Degree of Independence of Two Regions: Two regions *a* and *b* are neither completely dependent nor independent. The question of independence, particularly of parts within a whole, is a question of degree. It is possible to define the degree of independence of region *a* from region *b* (*indep* (*a*, *b*)), by referring to the amount to which the state of *b* can be changed without affecting the state of *a* (See Appendix 1). From this one can proceed to a definition of the degree of independence of one region from its immediate surroundings.

Differentiation Presupposes Natural Parts (Cells) Within a Whole: Within a limited homogeneous whole *W*, e.g., a liquid in a container, one can designate arbitrarily two areas, *a* and *b* (Figure 5), which may be independent to a considerable degree. Neverthe-

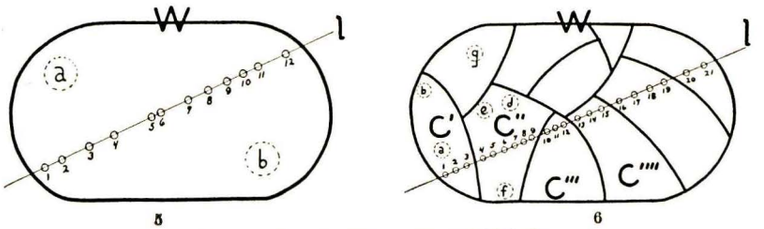


FIGURE 5. Undifferentiated Whole

W=whole; *a*, *b*, arbitrarily defined parts of *W*; *l*, line cutting *W* (see Appendix I, p. 228); 1, 2, 3 . . . small regions along *l*.

FIGURE 6. Differentiated Whole

W=whole; *C'*, *C''*, *C'''*, . . . natural parts of *W*; *a*, *b*, *c*, . . . arbitrarily defined parts of *C*; *l*, line cutting *W*; 1, 2, 3, . . . =small regions along *l* (p. 229).

less, the whole would not be called differentiated if there were no distinct natural parts. Such parts (C) can be defined as regions with a high degree of interdependence of the subregions (*a* and *b*; Figure 6) within one part, but a distinctly lesser degree of inter-

[6] There is no logical reason for the different properties which we consider typical for simple interdependence (or for organizational interdependence) to be always combined in this particular way. A more detailed analysis would require a study of the specific effect of each of these factors.

dependence between the subregions of different parts (a and e).

In other words, the concept of a differentiated whole presupposes the existence of natural parts (82) within a whole. We will call the natural parts of the whole "cells" (See Appendix 1).

We will indicate the degree of independence of a natural cell c from a neighboring cell n by $bo(c, n)$, to be read: the strength of the functional boundary of c against influences from n (See Appendix 1).

The degree to which neighboring cells are independent can be different both within the same whole and for different wholes. Wholes which do not show natural parts can be called undifferentiated.

Both psychologically and biologically, it seems to be characteristic of most organisms, and certainly it is true for a person, to be composed of natural subunits. In other words, organisms have a finite structure; a similar finite structure is characteristic for the life space as a whole (50).

The Degree of Differentiation: The degree of differentiation of a whole can be defined as the number of its cells.

A cell is defined by a certain degree of independence from its neighbors. The number of separated cells that are distinguishable within a given whole (W), in other words, its degree of differentiation ($dif^k(W)$), depends upon the degree of independence (k) which its cells must have to be considered two separate cells. The two values are inversely related.

$$(10) \quad dif^k(W) = F(1/k)$$

However, the degree of differentiation usually does not decrease continuously with increasing k, but shows points of sudden decrease where k increases from a value just below the independence of natural neighboring cells ($bo(c,n)$) to a value just above it (See Appendix 1). In other words, the degree of differentiation of a whole is not an arbitrary matter; it is determined by the natural cells of the whole. This does not exclude the fact that the degree of differentiation of a whole is relative to certain arbitrarily required levels of dependence or independence.

The Unity and the Degree of Differentiation of a Whole

The notion that the growing child shows an increasing differentiation is based partly on the observation that the unity of the growing child, as far as it is based on simple dependence (spreading), seems to decrease. We have discussed a variety of symptoms which indicate such a change. For a theory of regression it is essential to determine the conceptual relation between the degree of differentiation of a whole and the degree of its unity.

Definition of the Degree of Unity of a Whole.—The term dynamic unity of a whole refers to the degree to which the state of one part within the whole depends upon the state of other parts of that whole. The unity of a whole is said to be greater when the degree of interdependence of its parts is greatest.

Technically, one can define unity in a number of different ways (for instance, by referring to the average dependence of the parts). We will define the degree of unity of a whole as the *minimum* dependence of any part x on any other part y. In other words, we will measure the degree of simple unity of a whole ($si\ uni\ (W)$) by the degree of dependence (dep) of its least dependent parts.

$$(11) \quad si\ uni\ (W) = dep^{min}(x, y)$$

This definition of the unity of the whole W implies that, if the state of any part of the whole is changed to a degree greater than that defining the unity of the whole, every part of the whole is affected.

The concept of the degree of unity can be used for undifferentiated as well as for differentiated wholes and for arbitrarily defined wholes (containing two or more not connected regions). It is, however, possible to define "natural" wholes by a method similar to that used for the definition of cells (See Appendix 1).

The Unity of a Whole, its Differentiation and its Diameter.—What is the relation between the unity of a whole, as thus defined, and its degree of differentiation? In other words, what is the relation between the intimacy with which the state of one cell within a whole depends upon the state of any other cell of the whole and the number of cells contained in this whole?

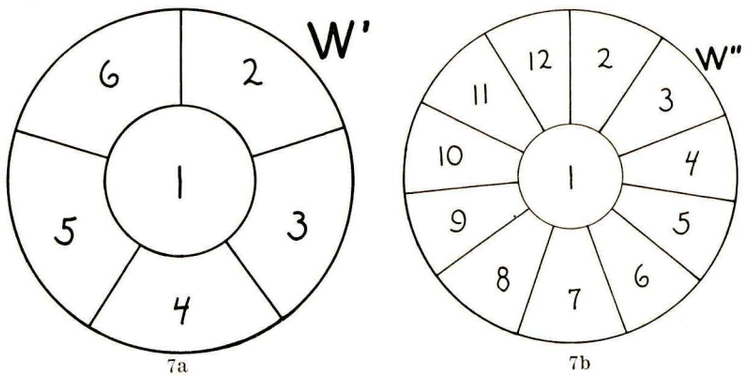
In the following discussion we will restrict our analysis to wholes where each cell is dynamically equal to every other cell, particularly in regard to the degree of independence ($bo(c,n)$) from the neighboring cells.

Given the same number of cells, and assuming that any two neighboring cells show the same degree of independence throughout the whole, the degree of unity of the whole is obviously small-

er, the greater the degree of independence of the neighboring cells (See Appendix 1).

One might expect that the unity of the whole would decrease with differentiation, that is, with an increasing number of cells. This is, however, not entirely correct.

Even in the case of the same degree of independence of each cell from its neighbor, an increase in the number of cells does not necessarily lead to a decrease in the unity of the whole. For instance, the degree of differentiation of the whole represented in Figure 7a, equals 6, that in Figure 7b equals 12. Nevertheless,



7a 7b

FIGURE 7. Central and Peripheral Layers of a Whole

Figure 7a. W', whole with one central and six peripheral cells. 1, central cells; 2, 3, . . . 6, peripheral cells. Figure 7b. W", whole with one central and twelve peripheral cells. 1, central cell; 2, 3, . . . 12, peripheral cells. *W"* is more differentiated than *W'* but the degree of simple unity of both wholes is the same.

the degree of unity of both wholes is the same. In other words, the unity of a whole depends not only on the degree of independence of each cell and the number of cells, but also, upon the way these cells are grouped; that is, it depends also on the structure of the whole.

The more detailed discussion in Appendix 1 shows that the structural factor which is decisive for the unity of the whole is the maximum "hodological distance" (53) between any two cells within the whole (measured by the minimum number of steps from one cell to another). We will call this maximum distance between any two cells of the whole ($e^{max}_{x,y}$), the "diameter" of the whole.

In case the cells of the whole are otherwise equal, the degree

of unity of the whole is inversely related to the degree of independence of neighboring cells and the diameter of the whole

$$(12) \quad si\ uni\ (W) = F\left(\frac{1}{bo(c,n), e^{max}_{x,y}}\right)$$

The Increasing Independence of Cells during Development.— It should be possible to relate the decreasing unity of a person during development to his increasing differentiation or more correctly, his diameter. Actually, however, a second factor seems to play a role. Kounin's study (45) on cosatiation of individuals of the same mental age, but of different chronological ages, shows that individuals of similar degrees of differentiation may nevertheless differ in regard to the degree of independence of corresponding regions within the person. This study is one more indication of the increasing independence of neighboring cells or, as Kounin says, of the growing rigidity of the individual with age.

One can co-ordinate to different states of tension of neighboring cells certain forces at the boundary between these cells. The strength of these forces will depend on the degree of the difference of these states. The degree of independence of two neighboring cells can then be conceived of as correlated to the maximum difference in tension which can be maintained by the boundary. In other words, it can be correlated to the maximum difference between the strength of the forces on each side of the boundary, or what may be called the maximum strength of resultant boundary forces.

This representation permits a convenient formulation of the relativity of dependence; two cells within a whole may be dependent in regard to strong resultant boundary forces and independent in regard to weaker forces. This implies that the degree of differentiation of a given whole is an inverse function of the strength of the forces relative to which the cells have to be independent (See Formula 13a). In other words we look for dedifferentiation (regression) when the resultant forces are too great (See Appendix 1).

Stratification: Central and Peripheral Layers; Inner and Outer Layers

In terms of the concepts discussed thus far it is possible to distinguish different layers within a whole. Psychologists have

made use of the concept of layers, particularly in referring to more central and more peripheral layers. This distinction has been found to be rather important in connection with needs (84, 37), and in consideration of the accessibility of the person (56).

One can distinguish two types of layers based on different characteristics. We limit the discussion again to the simplest case where all cells have the same dynamical properties within the whole.

Central and Peripheral Layers.—The maximum distance from a cell c to any other cell y within a whole ($e^{max}_{c,y}$) is usually not the same for every cell. From some cells it is possible to reach any other cell in relatively few steps. For instance, for the cell 1 in Figure 7a and Figure 7b this maximum distance equals 1; for any other cell it equals 2. Those cells within the whole for which this distance is equal to the diameter of the whole will be called "peripheral cells," and their totality, the "peripheral layer" of a whole. Starting from this peripheral layer we can distinguish more and more central layers (See Appendix 1). In Figure 7a and Figure 7b the most central layer is the cell 1.

Because of its position, a central cell is relatively more influential than a peripheral cell. The minimum change of a cell necessary to affect every other cell is smaller in a central cell. In this way the state of the whole depends more on the state of the central cells.

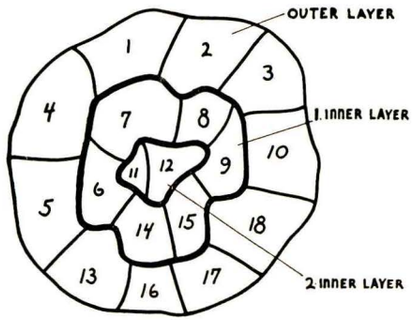
At the same time, central cells are, on the average, more easily affected by a change anywhere in the whole. In this way they are more "sensitive" to the state of the whole.

It is obvious that these facts may be linked to some of the properties commonly attributed to psychologically more central layers. It should, however, be emphasized that we do not have to deal here with the relation of ruling and ruled, but rather with relative importance based on simple interdependence.

The degree of unity of the central layer taken by itself is greater than the unity of the whole (in case this whole has also peripheral cells).

Inner and Outer Layers.—The degree of centrality of a cell deals with the question of how easily the cell is affected by changes *within* the whole. The question may be asked concerning the effect of the position of a cell on its being influenced by changes *outside*

the whole. This can be answered by distinguishing inner and outer layers. Cells which have a common boundary with the boundary of the whole can be called "outer" cells, and their totality the "outer layer" of the whole (Figure 8). Starting from the outer layer one can distinguish, in a similar way, more and more inner layers (See Appendix 1). It is entirely possible that the increasing distance between the ego and the environment which we have mentioned



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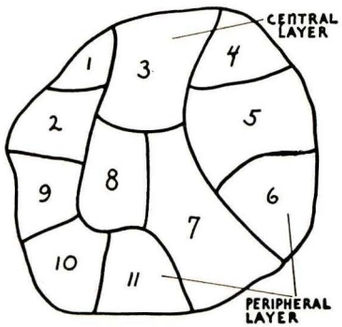

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FIGURE 8. Outer and Inner Layers of a Whole

The outer layer contains cells 1, 2, 3, 10, 18, 17, 16, 13, 5, 4; the 1st inner layer contains cells 6, 7, 8, 9, 15, 14; the 2nd inner layer contains cells 11, 12.

FIGURE 9. Case in Which a Central Cell is Part of the Outer Layer of the Whole

Central layer contains cells 3, 7, 8, because the maximum distance to another cell y within the whole is $e^{max}_{c,y} = 2$ for these cells. For the peripheral cells $e^{max}_{c,y} = 3$, because this cell only has no common boundary with the whole. The inner layer contains only cell 8. The cells 3 and 7 are outer cells in spite of being central.

above (p. 22) is partly related to the increasing stratification of the person during development.

Cells which are central are frequently located in an inner layer. However, this is not necessarily so; a central cell may belong to the outer layer (See Figure 9 and Appendix 1).

Inhomogeneity and Variety of the State of a Whole

One of the outstanding behavioral characteristics of development is, as we have seen, the increasing variety of behavior. Dynamically, the greater variety of behavior will have to be

linked to a greater variety of patterns of states which can be realized in a given organism.

Homogeneity, Differentiation, and Unity of a Whole.—A highly differentiated whole can be very homogeneous: the state, for instance, the state of tension, of every cell may be the same throughout the whole. However, there exists a relation between the maximum difference in the state of any two cells and certain aspects of the differentiation of the whole. A more detailed discussion shows (See Appendix 1) that the maximum inhomogeneity within a whole, that is the greatest difference of the state of any two parts, is closely related to its diameter and to the degree of independence of neighboring cells. The maximum inhomogeneity is an inverse function of the unity of the whole.

Variety of Patterns.—The number of patterns of states which can be realized within a given whole depends upon the degree of independence of the cells, upon the diameter, and in addition, upon the number of cells, that is, the degree of differentiation of the whole (See Appendix 1).

Our discussion of dynamic wholes thus far has been based on rather general properties. To link these properties with the actual behavior of a person, one has to consider the more specific characteristics of an organism. It is possible with most organisms to speak of something like a normal state. Biologically and psychologically, there are limitations to the change of the state of a cell beyond which the boundary between the cells, or the cells themselves, will be destroyed and the organism will die. This fact limits the change in the state of the cells of a living whole to a relatively narrow range and to definite absolute levels. It sets very definite limitations to the variety of patterns which can be realized within an organismal whole.

If a cell or a larger part of the whole is kept on a fixed level by outside influences or such factors as a need in tension, the variety of possible patterns decreases. In other words, the flexibility and richness of behavior is reduced. The degree to which the variety of pattern decreases depends, for a given whole, mainly upon (1) the degree of centrality of the cell which is kept on a certain level, (2) the degree to which this level deviates from the normal state, and (3) the number of these cells (See Appendix 1). A reduction of the variety of behavior can be viewed as a regression (p. 254). Therefore, these factors are of importance for the understanding of regression.

The Degree of Hierarchical Organization

We have distinguished between two types of dependence, namely, simple dependence and organizational dependence. Having discussed differentiation, unity and variety of pattern as a function of simple dependence between the parts of a whole, let us turn to a discussion of the properties of a whole based on the organizational dependence of its parts.

The "leader-led" relation, which is characteristic for organizational dependence, may be represented with the help of the concept "power field." This concept, which has shown its usefulness in social psychology (50, 56, 12, and Wiehe, F.: (quoted by Lewin, 49)) indicates the ability of one person to induce forces acting on another person. One can distinguish the strength and the scope of the power field. It is one important aspect of the relation between leader and led that the power field of the "leader" over the "led" is stronger than that of the "led" over the "leader."

One can apply this concept to parts of a whole and distinguish "leading" and "led" cells by referring to their power fields. For instance, the forces acting on the cells of the motor region can be said to be induced by the power field of cells belonging to the inner personal region (50).

Cells which rule other cells may themselves be ruled by a third group of cells. One can define the degree of hierarchical organization of a whole by the number of strata each of which rules a ruled stratum.

The Organizational Unity of a Whole

A conceptual clarification of what is meant by organizational unity is a necessary but rather difficult task. This term is usually linked to considerations of "harmony" or "efficiency." A well organized unit is a whole which has one and not two or more competing "heads." One speaks of a "disorganization," or lack of unity also if the executive organs do not obey or do not readily obey the inducing power of the leading regions.

It seems to be possible to represent both aspects of organi-

zation by a relatively simple formula which refers to the strength of the power field of that part of the whole which has the function of head in relation to the strength of the power field of the rest of the whole (See Appendix 1).

To some degree the organizational unity of a whole depends on the properties of its "ruled" cells, the "executive" in Koffka's sense[7] (41). This would be maximal if the executive had the properties of a good medium as defined by Heider (31), i.e., if it were composed of a great number of relatively independent parts, the state of which could be easily changed. This point is important for the conditions of regression, as we will see later.

Probably the efficiency of the executive organs as a medium increases during childhood, at least in early childhood. But the number of heads of the hierarchical organization, probably does not show a simple steady progress. In certain periods the whole person may be governed by one head and its organizational unity will be correspondingly high. The region which functions as a head, may, however, differentiate into relatively independent cells and this will decrease the organizational unity of the child. Later on, a new head may emerge, and later further differentiation of the new head may follow, etc. In this way the hierarchical organization of the whole would increase, while at the same time its degree of organizational unity would periodically decrease and increase with the differentiation and organization of its head (Figures 4b and 4c). That development of behavior frequently proceeds through periods of more harmonic and more unharmonic stages (crises) may be taken as an indication of the correctness of this view.

Extension of the Life Space

The scope of the life space can be represented with conceptual means developed elsewhere (15, 54). One may distinguish three main dimensions of extension. One deals with the scope and differentiation of that area which for the individual has the character of the present reality. The second deals with increasing differentiation in the reality-irreality dimension (74). The third deals with the extending psychological time dimension, i.e., with the extending "psychological past" and "psychological future" which exist as parts of the life space at a given time (15, 54).

[7] By this term Koffka does not mean the "head" which leads but that part of the system which executes.

Regression of behavior should result if the scope of the reality level of the life space is narrowed down, or if its psychological time dimension or its reality-irreality dimensions are reduced. Moreover a change in behavior showing some characteristics of regression should result if the functional connection between the reality and irreality level is severed, i.e., if the link between fantasy and action is cut.

Chapter II

EXPERIMENTAL REGRESSION THROUGH FRUSTRATION

The Problem under Investigation

This study reports an attempt to create regression in children by frustration. It can be viewed from two angles. First, it tries to clarify the nature of regression and the conditions leading to it by testing certain theoretical assumptions about regression. Second, it can be viewed as a contribution to the study of frustration.

Some Situational Conditions for Regression

It is possible to derive from the conceptual representation of developmental levels, certain conditions which should lead to regression.

We have seen that the developmental levels differ in a variety of aspects, such as degree of differentiation, organization, etc. In regard to each of these aspects it should be possible to set up theoretical predictions as to the conditions under which regression should occur, i.e., what conditions should result in dedifferentiation, in disorganization, etc. There exists, obviously, a great variety of possibilities in regard to each of these aspects and their combinations. We have been aware of some of these aspects from the beginning, others became apparent during the study. We will first discuss a few considerations which have led us to investigate regression and which have determined the experiments. A number of other factors which have been relevant will be dealt with when we discuss the experimental results.

One of the conditions which may lead to regression is a situation in which the person is under unusually high pressure or where he is in a state of particularly high tension. Indeed, from the conceptual representation of developmental stages it follows that a state of high tension should lead to a regression in at least two respects. If the state of tension in some cells is

kept high the variety of patterns which can be realized is greatly diminished (See Appendix 1). In other words, in the case of very strong forces, or high tensions, the degree of differentiation of a given individual is reduced. Secondly, the organizational unity is likely to be affected because the high tension level makes the executive regions a less efficient medium. In other words, frustration processes of the type of spreading of tension, increase in importance relatively to organizational processes (See formula (8) p. 27). In addition dedifferentiation is likely to affect directly the degree of hierarchical organization.

The Effect of Frustration on Activities Not Related to the Inaccessible Goal

A frustrating situation, i.e., a situation where an individual is prevented from reaching a desirable goal is one way of creating tension. There are a great number of experimental facts concerning animals, children, and adults which indicate this. The representation of the relation between frustration and tension is relatively simple, and has proved fruitful in a wide variety of conflict situations (reward and punishment (49), physical or social obstacles to a goal (16), anger situation (12), substitution (74)).

The experiments on animals and human beings have given us a fair knowledge of the main factors determining the strength of frustration, such as the relation to needs and to the distance between an individual and his goal. We know the usual development of such frustration situations, e.g., a tendency to take round-about routes, alternation between temporarily leaving the field and coming back, and the final giving up. The theory of these processes is relatively well developed (12). We know some of the conditions which facilitate and hinder round-about routes in such a situation and some of the factors which determine the particular form of restless movements (49).

If the tension in frustrating situations is too high the actions in the direction of the goal are likely to become emotional and more "primitive." In other words, instead of trying to find round-about routes in an organized systematic way, direct actions occur which are frequently vague and primitive in character. We suppose most psychologists would agree that one can speak here quite correctly of regression of behavior. Indeed, the way

an older person tries to reach a goal in the case of high tension shows certain similarities to the actions typical for a younger person (12).

The experiments which we are going to report are not intended to provide additional proof of the fact that in a state of high tension the action toward an obstructed goal regresses to a primitive level. They are an attempt to go one step further. If it is correct that a sufficiently high tension leads to a regressed state of the individual, this regression should show itself not only in the action toward the inaccessible goal, but also in behavior which is not related to this goal.

Case studies indicate that the frustration of an individual in one area may affect his mood and his behavior in other areas of activity. The situation in the personal life of the individual may readily affect his occupational life. Popular opinion about the way frustration in one field affects a person's activity in another field is full of contradictions. Frequently it is held that much hardship and frustration has a favorable effect on the productivity of the artist. On the other hand, it is held that such situations hamper productivity.

From our theoretical consideration it should follow that if the tension level is increased too greatly, the individual should regress. The following experiments test this hypothesis.

Degree of Constructiveness of Play as a Symptom of Regression

In experiments with young children it is not advisable to use extremely frustrating situations. It is necessary to restrict the intensity of frustration to degrees which are well within the limit of the everyday experience of most children. This makes it necessary to find a symptom of regression that is sufficiently sensitive to indicate small changes in the state of the person. We have chosen for this purpose the free play activity of the child. We did so mainly for three reasons.

First, we expected that certain properties of play which we will call the "constructiveness of play" were closely related to the developmental stage of the person. The term constructiveness should not be understood here as opposite to destructiveness. We have in mind such qualities as the degree of differentiation and organization of play activities quite independent of their content, for instance, independent of whether or not they involve building up or tearing down. (It is possible, of course, that destructive actions are usually more primitive than ones involving construction.)

Second, we have seen that the developmental level of behavior is not necessarily a reliable symptom for the developmental state of the individual (p. 11). If the child is told to carry out a definite task, such as folding a piece of paper in a specific manner or any other minutely prescribed task, relatively little is left to the individual and the extent to which the activity will mirror the character of the individual is rather limited. In a situation of free play, little is enforced from outside, particularly if sufficient play material is provided and if this material is sufficiently flexible (74). One would expect, therefore, that free play would indicate particularly well the state of the individual. The so-called "play technique" assumes that the play of a person reveals his needs and problems. From similar considerations, we have assumed that the character of the play should be a useful symptom of the developmental state of a child and of any shifts in this state.

Third, the level of constructiveness of an individual's activity seems to be particularly closely related to his whole life space. Constructiveness is intimately linked with both the reality and irreality levels of the life space; fantasy and realistic judgment are closely interwoven in any constructive action. The extension of the life space and its degree of differentiation play an important role also. We have assumed, therefore, that constructiveness is a sensitive indicator for regression.

Experimental Procedures

General Arrangements

Technically it has been the aim of this investigation to compare the behavior of children in a nonfrustrating or free play situation with their behavior in a frustrating situation. We have been especially concerned with productivity, or creativity of behavior.

Every child was observed on two occasions: first, in a free play situation during which the subject was placed in a standardized playroom and allowed to play without restriction, and second, in a frustrating situation during which the subject was

placed in the same room with the same toys as on the first occasion, but to which a number of much more attractive, but inaccessible, toys had been added. The latter arrangement was provided by replacing one of the walls of the original room with a wire net partition through which the subject could easily see the fine toys, but through which locomotion was impossible.

Subject	Chronological Age, Months	Mental Age, Months	IQ
1	28	37	133
2	28	30	107
3	29	41	141
4	29	32	110
5	30	30	100
6	33	39	117
7	34	35	103
8	35	39	112
9	37	42	114
10	40	44	111
11	42	49	117
12	43	62	145
13	45	51	111
14	46	72	157
15	47	56	119
16	48	58	121
17	49	55	113
18	49	66	135
19	51	59	116
20	51	65	128
21	52	62	120
22	53	65	122
23	53	80	151
24	55	82	150
25	55	73	133
26	58	64	110
27	58	64	111
28	59	67	113
29	59	70	119
30	61	72	118
Mean (ten youngest (ten yougest children)	32.3	36.9	114.8
Mean (twenty oldest children)	51.7	64.6	125.5
Mean (total group)	45.2	55.4	121.9

The Subjects

The subjects in the experiment were children taken from three age groups of the preschool laboratories of the Iowa Child Welfare Research Station during the academic year 1935-1936. The number of children from each group is as follows: ten children from first group (2 to 3 years), twelve children from second group (3 to 4 years), and eight children from third group (4 to 5 years). The chronological ages, mental ages, and IQ's are given on the preceding page; these ranged from 28 to 61 months, 30 to 82 months, and 100 to 157, respectively. The Kuhlmann-Binet was used with the ten youngest subjects; the Stanford-Binet with the older subjects.

Establishing a Free Atmosphere for the Child

In a free play situation every effort was made to establish optimal conditions for constructive play. For this reason insecurity on the part of the child was very undesirable and attempts were made to eliminate it.

To help give the children a feeling of security in order that they might behave freely and spontaneously, and also to allow the experimenter to become acquainted with them, several precautions were taken:

1. Before starting experimentation, the experimenter took part in the activities of the preschool for ten days.

2. A child was used as a subject only if his initial attitude toward the experimenter and toward coming to the experimental room was positive.

Each child was asked to take part in the experiment in the following way: "Do you want to come and play with me?" (This is a general procedure used by experimenters and testers in the preschool laboratories.)

Although the children in the school are accustomed to being tested and to participating in experiments with different people, willingness to participate varies from child to child and from situation to situation. Some children, upon hearing the experimenter invite another child to "come and play," spontaneously ask to go too; others go only after being requested, but comply willingly and without hesitation; still others are reluctant to go. These latter children were not used as subjects.

3. The children were familiar with the building in which the experiments were conducted, having to stop in it every day for routine medical inspection, and going to it frequently for tests and examinations.

4. Upon going to the experiment the child had to put on his wraps, and was helped by the experimenter. The experimenter tried to keep the child in a good mood, and to make the situation an open and free one

while putting on and taking off the child's wraps and walking across the street with him. At the same time, these situations gave an opportunity to observe the child and his attitude toward the experimenter.

5. In all cases, where the above mentioned precautions did not seem sufficient to develop free and spontaneous behavior, we introduced a special preliminary play period. In this preliminary period the child was taken to the experimental room for fifteen or twenty minutes of play with blocks and balls during which the experimenter tried gradually to gain his confidence by playing with him. This precaution was required at the beginning of the school year, since at that time many children were newcomers to the preschool, and the general situation was strange to them. Later, when the children felt more secure and free, both in the school and with the experimenters, it was not thought necessary to use a preliminary play period.

The Free Play Situation

The arrangement of the experimental room in the free play situation is shown in Figures 10 and 11. It was 14 by 8½ feet,

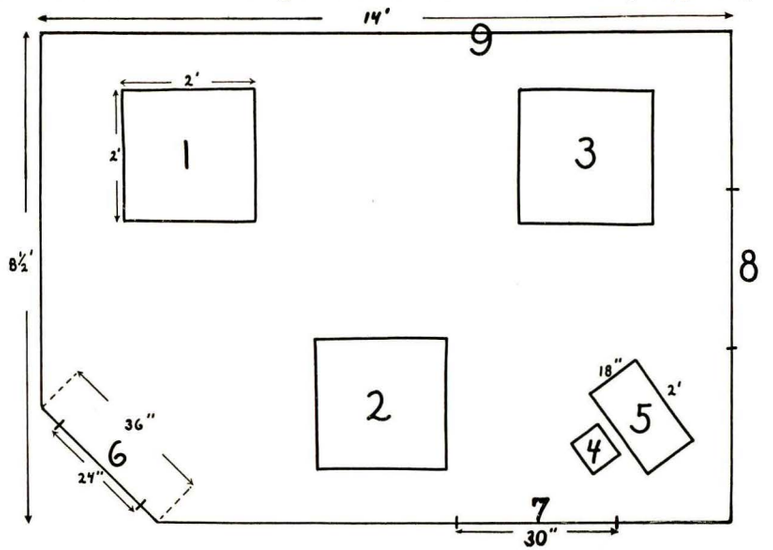


FIGURE 10. Diagram of the Free Play Situation

1. Square of paper on which the following toys are placed: a child's chair, teddy bear, doll, cup, small truck and trailer, saucer, teapot, ironing board and iron, and telephone receiver. 2. Square of paper on which the following toys are placed: box of crayons, two pieces of writing paper. 3. Square of paper on which the following toys are placed: motor boat, sail boat, duck, frog, fishing pole. 4. Experimenter's chair. 5. Experimenter's table. 6. Observation screen. 7. Entrance door. 8. Window. 9. Opaque partition (now functioning as a wall).

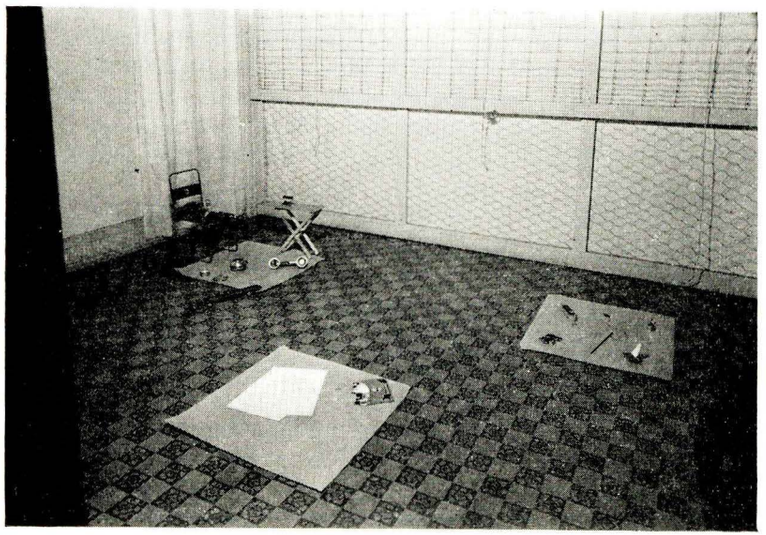


FIGURE 11. The Setup in the Free Play Situation

had two doors, and a window. The wall (See 9, Figure 10) consisted of two wooden frames, 12 by 3 feet, covered with wire mesh netting. These frames could be moved up and down in a vertical slot along the walls adjacent to them like window frames. In the free play experiment, the frames were in such a position that one of them rested on the floor, while the other extending from the top of this lower one, nearly reached the ceiling. On the back of each frame, that is, behind the wire mesh netting, an opaque canvas covering was stretched. The canvas was the same color as the room, making the partition appear to be the fourth wall.

One door (See 7, Figure 10) was used as the entrance door; the other (See 6) into which a one-way observation screen was built, was locked. Behind this one-way vision screen one of the experimenters was seated to act as an observer. The second experimenter, who conducted the experiment, sat in a child's chair (See 4) at a small table (See 5) near the window (See 8).

On the floor of the room were three squares of paper each 24 by 24 inches. A set of standardized play materials was placed on each. On the square designated as 1 (Figure 10), were a child's chair on which a small teddy bear and a doll were seated,

a cup, a small truck and trailer, a saucer, a teapot without a lid, an ironing board and an iron (but nothing to iron), and a telephone receiver which squeaked when shaken. On square 2 were placed a box of crayons and two pieces of writing paper, 8½ by 11 inches.[8] On square 3 there was a small wooden motor boat, a sail boat, a celluloid duck, a frog, and a fishing pole and line on the end of which was a magnet.

After entering the experimental room with the child, the experimenter approached square 1, and picking up each toy said, "Look, here are some things to play with. Here is a teddy bear and a doll. Here is an iron to iron with, etc." In proceeding this way, the experimenter named and demonstrated every toy on all three squares. Then he said, "You can play with everything. You can do whatever you like with the toys, and I'll sit down here and do my lesson." The experimenter then sat on the chair at the table.[9]

The child was left to play alone for a thirty-minute period. During this time the experimenter, as if occupied with his own work, sat at his table in the corner and took notes. If the child made a social approach, the experimenter responded, but attempts were made to keep this at a minimum without, however, becoming abrupt or curt. The experimenter entered the play situation of the child as little as possible, at the same time behaving naturally. The objective was to minimize the social factors in the situation and to provide an atmosphere of security and freedom for the child.

After a half hour, the experimenter made the first "leaving suggestion" to the child. He said, "I'm about through. Will you be ready to go pretty soon?" If the child said "No" or did not answer, the experimenter waited for about a minute and then said, "Shall we go to the preschool now?" If this suggestion was not accepted, the experimenter made a third leaving suggestion

[8] In the early experiments a peg-board, beads, a rolling wagon, and plasticene were also placed here.

[9] This procedure was modified slightly in later experiments in order to make the child more curious about the toys. When the child was brought into the room, the toys were not yet distributed on the squares. A basket with the play materials stood in the corner and the experimenter took the basket and in the presence of the child distributed the toys on the squares. The experimenter named the single objects as he put them down.

after a minute or two. If the child did not want to leave at the third suggestion, the experimenter started to leave the room, saying, "I have to go now." In every case this was sufficient to make the child want to leave the experimental room.

The Frustration Situation

Three parts of the frustration experiment can be distinguished in the temporal order of their occurrence: (a) the prefrustration, (b) the frustration, and (c) the postfrustration periods.

Prefrustration Period.—The arrangement of the room in the prefrustration period is shown in Figures 12 and 13 on pages 54 and 55. The partition dividing the room was lifted so the room was twice the size it had been in the free play situation.

The squares, 1, 2, and 3, were in their usual places, but all toys except those on square 2 had been removed and incorporated in the much more elaborate and attractive new set of toys in the new part of the room.

In the added part of the room was a big doll house (3 by 3 feet), brightly painted and decorated. The child could enter the house through a doorway. Inside there was a bed upon which the doll was lying, and a chair in which the teddy bear sat. The ironing board with the iron on it stood against one wall and the telephone, this time on its base with a dial and bell, was in the corner. There was a stove with cooking utensils, and a cupboard. The house had electric lights, curtains, and a carpet.

Outside the house was a laundry line on which the doll's clothes hung. A rubber bunny sat near the entrance to the house. A large delivery truck (23 inches long) stood near the house, and behind it was the small truck and trailer used in the preceding experiment. Nearby was a child's table prepared for a luncheon party. On the table were cups, saucers, dishes, spoons, forks, knives, a small empty teapot, and a large teapot with water in it.

In the other corner of the new part of the room was a toy lake (3 by 3 feet) filled with real water. It contained an island with a lighthouse, a wharf, a ferry boat, small boats, fishes, ducks, and frogs. The lake had sand beaches.

In all cases the children showed evidences of great interest in the new toys, and at once started to investigate them. Each child was left entirely free to explore and play as he wished. During this time, the experimenter "did his lessons."

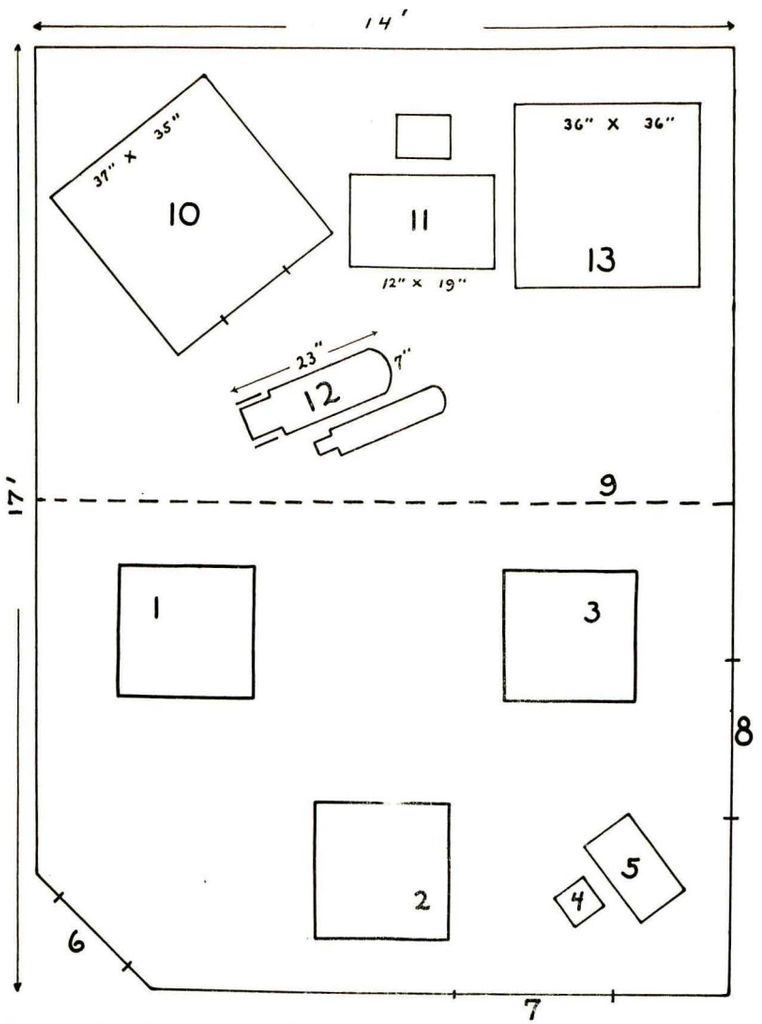


FIGURE 12. Diagram of the Pre-frustration Period of the Frustration Experiment

1. Square of paper (without toys). 2. Square of paper on which are placed crayons and paper. 3. Square of paper (without toys). 4, 5, 6, 7, 8, as explained in caption of Figure 10. 9. Lifted partition. 10. Toy house containing the following toys: doll, chair, teddy bear, bed, ironing board, iron, telephone, stove with cooking utensils, cupboard, electric lights, curtain, and carpet. 11. Tea table with tea set. In front of it a child's chair. 12. Large truck and trailer. Nearby a small truck and trailer. 13. A lake with real water containing: island with light house, wharf, ferry boat, small boats, fishes, ducks, and frogs.

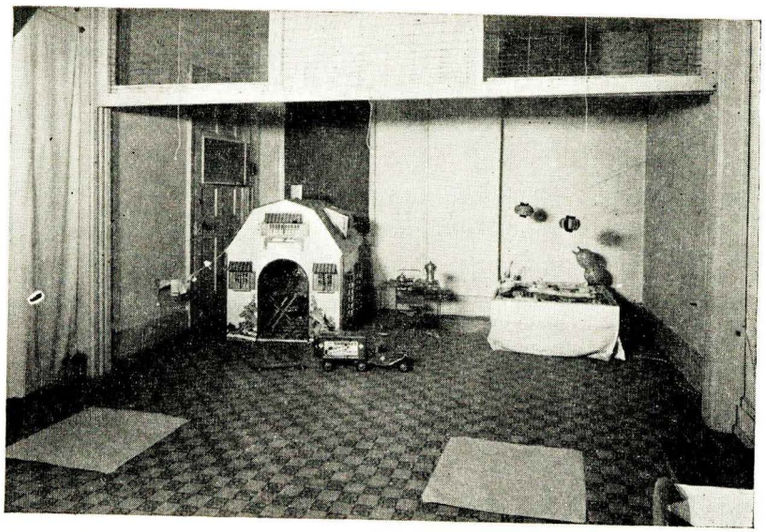


FIGURE 13. The Setup in the Pre-frustration Period of the Frustration Experiment

If, after several minutes, the child had played with only a limited number of objects, the experimenter approached and demonstrated the other toys, e.g., he dialed the telephone, or showed the child how to get the water from the spout of the teapot. In general, the experimenter called to the child's attention every toy he had overlooked. Following this the experimenter returned to his place, and waited until the child had become thoroughly involved in play; this varied from five to fifteen minutes.

The transition from prefrustration to frustration was made the following way: The experimenter collected in a basket all the play materials which had been used in the free play experiment and distributed them, as before, on the squares. He then approached the child and said, "And now let's play at the other end," pointing to the "old" part of the room. The child went or was led to the other end of the room and the experimenter lowered the wire partition and fastened it by means of a large padlock. The part of the room containing the new toys was now physically inaccessible but visible through the wire mesh netting.

Frustration Period.—The arrangement of the room in this part of the experiment is shown in Figures 14 and 15. With the lowering of the partition, the frustration period began. This part of

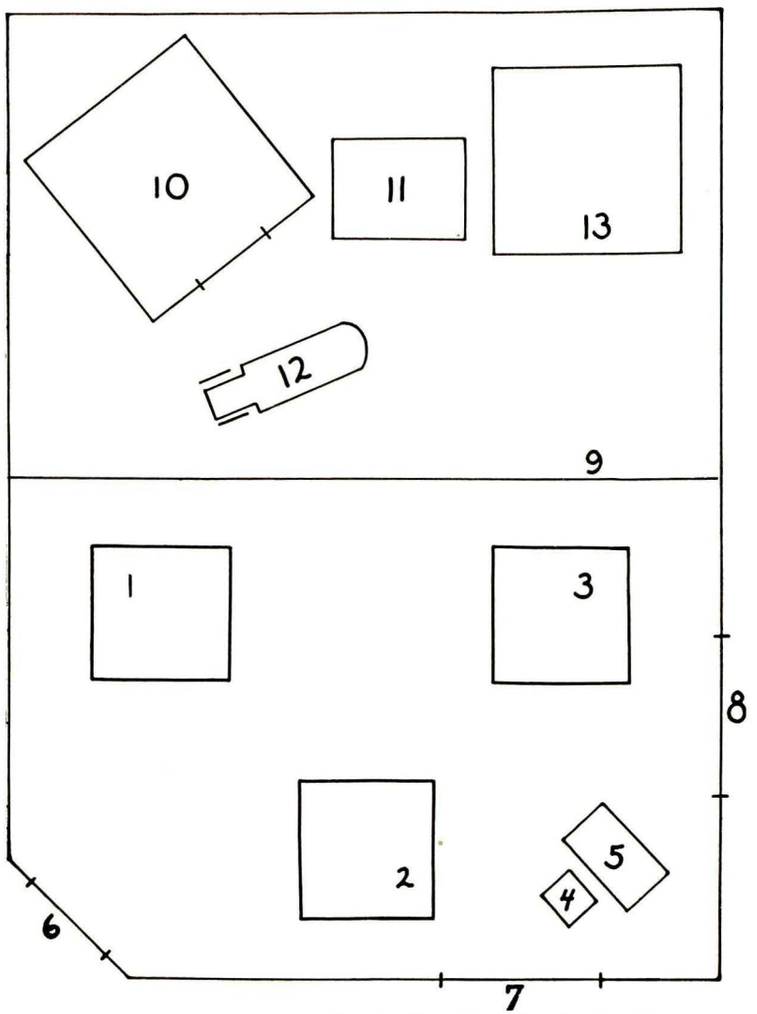


FIGURE 14. *Diagram of the Frustration Period of the Frustration Experiment*

1, 2, 3. Squares of paper on which the same toys are placed as in the Free Play Situation (see Figure 10). 4, 5, 6, 7, 8, same as Figure 10. 9. Transparent partition through which the house with toys (10), tea table with tea set (11), big truck and trailer (12), lake with lake toys (13), are visible.

the experiment was conducted exactly as the free play experiment. The experimenter wrote at his table, leaving the child completely free to play or not, as he desired. Here again the child's questions were answered, but the experimenter remained aloof from the situation in as natural a manner as possible.

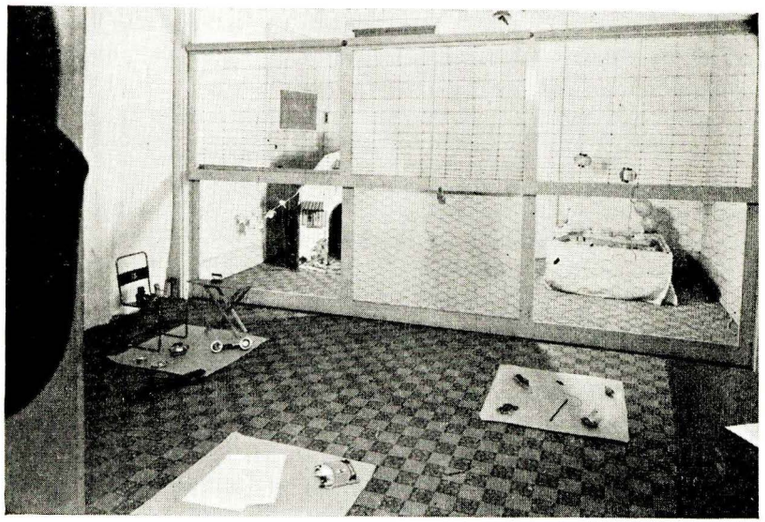


FIGURE 15. The Setup in the Frustration Period of the Frustration Experiment

Thirty minutes after the lowering of the partition, the experimenter made the first leaving suggestion. Contrary to the behavior in the free play experiment, the child was usually willing to leave at the first suggestion.

After the experimenter had made sure that the child wanted to leave, the partition was lifted. Usually the child was pleasantly surprised and, forgetting his desire to leave, joyfully hurried over to the fine toys. If the child did not return spontaneously, the experimenter suggested his doing so, and a second suggestion was never necessary.

Postfrustration Period.—The lifting of the partition at the end of the frustration period was not done with an experimental purpose, but to satisfy the desire of the child to play with the toys and to obviate any undesirable after effects. The child was allowed to play with the house, lake, etc., until he was ready to leave.

Additional Remarks about the Technical Arrangements

Toys.—Several requirements had to be fulfilled to make the toys adequate for the experiment:

1. They had to be sufficiently attractive to interest the child on two occasions for at least half an hour.
2. They had to be sufficiently interesting to children of the ages participating in the experiment.
3. Toys had to be such as to allow for enjoyable play on different levels of constructiveness.
4. Toys behind the barrier had to be much more attractive than the accessible toys.

On the basis of our experience in eight preliminary experiments, the toys which have been described were selected as adequately fulfilling these requirements.

Involvement of the Child.—It was for the purpose of strengthening the child's desire for the inaccessible toys that he was first given an opportunity to play with them in the prefrustration period. The experimenter lowered the partition, initiating the frustration period when he believed the subject had become thoroughly interested in the play. It was thought that the attraction of the toys would be approximately maximal at this time. Typically, the children spent considerable time exploring the fine new toys before starting real play. The preliminary experiments had indicated that without giving the child time to become involved in the play with these toys the later frustration was not very effective.

The Barrier and the Visual Accessibility of the Inaccessible Toys.—The barrier was chosen with a view to creating strong frustration. Two principles were followed here: a partition was selected which would provide (1) maximum visual accessibility to the toys behind it, and yet one which (2) was very clearly physically impassable.

The first point is related to a question which is of prime importance for frustration, both theoretically and practically. An individual is in a state of frustration only if, and as long as, the inaccessible goal (G) is a part of his life space (Figure 3a). Obviously, if the individual is in no way aware of the inaccessible objects (G), for instance, of the toys in the other room, he cannot be frustrated in regard to them because they do not exist for him psychologically (Figure 3b). Even if the individual has known of the inaccessible objects, and has tried to get them, he may give up

these attempts in a way which seems to be nearly equivalent to omitting them from the life space. This is particularly true if the matter is not of great importance to the individual. These considerations indicate that the amount of frustration depends upon the degree to which the nonaccessible goal is kept alive or present within the life space of the individual. This is well in line with the following experience.

In the preliminary experiments, a half-inch mesh netting was used, reducing the visibility of the toys. Since this was clearly unfavorable for setting up strong frustration, a larger mesh, i.e., chicken wire on the lower panel and hog fencing on the upper was substituted. In addition to carefully arranging the barrier, the area behind it was more brightly illuminated than the other part of the room. The netting was attached to strong frames which were securely fastened with a big padlock in the presence of the child. This was to impress the child with the fact that there was no way of gaining access to the goal.

Minimizing the Social Factors in the Situation.—As mentioned before (p. 52) the experimenter minimized the social aspects of the experiment as much as possible; he pretended that he had his own work to do and refrained from approaching the child. However, in order that the child should feel free and be at ease in the situation, the experimenter did not ignore the approaches of the child. If the child questioned him about the name or nature of the toys, he answered briefly, but not abruptly. If the child started to play with him, e.g., put the telephone to his ear and ask him to talk, the experimenter said a word or two and returned to his work.

Lowering the Partition.—To initiate the frustration period, the experimenter first asked the child in a matter-of-fact way to return to the "old" part of the room. Some children followed this request without protest, often seeming a little baffled as to what was happening. Other children ignored the request, or answered quietly in the negative and continued playing. Occasionally a child would protest the interruption and resist the experimenter's attempts to remove the toys. Such a child might even retrieve the toys and bring them back to the lake or the house. In such a case, the experimenter allowed the child to continue with his play for a short time, but soon repeated the request and began collecting the toys again.

The experimenter succeeded every time in getting the child

to leave the fine toys without forcing him physically. The barrier was immediately lowered and locked with the big padlock. If the child wanted to know why the partition was lowered, the experimenter gave no explanation, but simply answered "you can play on this side now." This answer was deliberately vague and acquired any meaning that the child might give it. In this way the child was left free to look upon the lowering of the partition as an inexplicable occurrence, to ascribe it to the ill will of the experimenter, or to assume a general rule to which the experimenter, as well as he, had to comply. The attempt was made to make the situation as impersonal as possible.

Observation and Analysis

Observation Techniques.—The observations were made by two persons: an observer behind a one-way vision screen (See 6, Figure 10) and the experimenter (See 4, Figure 10). The observer made a running account of the child's behavior on an especially constructed, constant-speed polygraph, carrying paper one inch every thirty seconds.

To synchronize the record of the experimenter and the observer, a pen, fixed to a signal marker, was set close to a guide bar on the polygraph. By means of a switch hidden beneath his table, the experimenter could indicate, by using a code, the beginning or the end of any event he was observing. To measure the time spent in any event, a celluloid stencil was used with crosslines spaced to indicate five-second intervals.

The presence of two observers during the experiment had these advantages:

1. During periods when the experimenter was occupied with experimental procedures, the observer's record was available.
2. The behavior of the experimenter was recorded by the observer.
3. The presence of two observers made it possible for them to concentrate on different aspects of the behavior and thus to obtain more and better observations. The observer emphasized the activities of the child, the experimenter the conversation and the general meaning of what was happening.
4. The use of two observers permitted the role of experimenter and observer to be shifted between two persons and thus the influence of a single experimenter upon the result was avoided.

Preparation of the Records.—The raw data consisted of two synchronized running accounts of the course of events of the experimental session. These separate records were combined into a single more complete account. This was valuable since, as mentioned before, the observers concentrated their attention upon different aspects of the behavior. Furthermore, an observer behind a screen necessarily misses much; the verbalizations of the child are often incomprehensible and facial expressions and gestures lose much of their significance. This is partly because of the fact that the screen interferes with visual and auditory perception and, in the present case, it was accentuated by the fact that most conversation was addressed to the experimenter across the room. On the other hand, the very wealth of the material which the experimenter within the room is able to observe causes him sometimes to miss the sequence of activities.

The method of synchronization mentioned above made it possible to combine the two specialized records into a much more complete account than any single observer could obtain.

Analysis of the Records, Units of Action, Episodes of Behavior, and Emotional Units.—Although the intention was to observe each child for 30 minutes on the two occasions, unavoidable variations occurred so that it was necessary to limit the analysis to 24 consecutive minutes.

For purposes of analysis, it is obviously necessary to divide a continuous record of behavior into parts (55, 2). This is a fundamental problem of methodology in psychology. There are many possible ways of dividing the behavioral continuum; the particular problem at hand determining to a considerable extent the particular fractionation to be used. There are, however, some fundamental principles to be considered: in general it may be said that all such divisions must be in terms of psychologically significant units of activity.

Obviously not all possible divisions are psychologically satisfactory. For instance, the fractionation cannot be done in terms of arbitrary physical time units such as seconds or minutes. In dividing a record into physical time units one might have to separate the sentence, e.g., "Teddy, go and watch Mother iron," into two parts: "Teddy, go and w-" and "atch Mother iron." The letter "w" might be the last letter which falls in the first unit, and the second might start with "atch." Such a cut according

to physical time units destroys the psychological meaning of the occurrence. It is inadequate.

In defining psychologically meaningful parts, we may distinguish between actions which are guided to a particular end by a central idea or purpose, the actions being the means to this end, and those which do not involve such "means-end" relations. In the former case, a sequence of behavior which is guided by a common idea or purpose is a psychologically significant unit. Such a sequence may or may not be homogeneous as to the activities or materials involved. Thus the child who places different things on a truck and pushes it across the floor in order to deliver them to a play store incorporates a great diversity of action within one behavior unit. In cases where activities are not guided by a central idea as means to a more or less distant end, the division into behavior units can be made on the basis of the homogeneity of the actions. In this case the activity is its own end. For instance, when the child is rhythmically swinging the fishing pole, pushing the truck back and forth when no other intention is involved, or walking aimlessly about, a change in the activity is an indication that the psychological unit has changed since the activity and the end are one.

On this basis divisions of the continuous record have been made. We will designate them as "units of action." These units of action varied in length from 5 seconds to several minutes.

Such behavior units may be at the same time parts of more inclusive units. For instance, the psychological behavior unit of eating lunch may be a part of the larger unit of "going on a picnic," which in turn may be part of the still more inclusive action of "entertaining guests." All such units are psychologically important. Which of them is most significant depends upon the particular problem at hand. For some problems, we have divided the course of events into larger units designated as "episodes of behavior" (See p. 155).

To regard a course of events as a sequence of units of actions is not the only way to divide it. Emotional behavior and moods such as crying, being depressed, feeling happy, or restless can also be conceived of as natural psychological units within the course of events. These units are somewhat different from the units of action mentioned above, and frequently the beginning and the end of a unit of action does not coincide with the beginning

and the end of an emotional unit. For example entertaining guests might be divided into the following units of action: calling for friends, riding in the car to the picnic place, ordering lunch, eating lunch, taking a walk, etc. The division in emotional units might be: first, strangeness and formality (if the guests are new acquaintances), then easiness and familiarity, and finally, a tactless remark might lead to a period of uneasiness for the rest of the time. Obviously these units would not necessarily coincide with the units of action.

Sometimes units of action coincide with emotional units, e.g., when a child kicks the barrier. One can look upon this as a unit of action with the purpose of breaking the barrier which hinders locomotion to the desired toys, and also as an emotional unit expressing the anger of the frustrated child.

The course of events, therefore, may be divided into emotional units or into units of action, or both. For some problems the emotional units, the changes in emotional atmosphere are more important than the units of action.

In our experiments analysis has been made of both units of action and units of emotional mood. However, time has not permitted the treatment of the problem of mood changes in more than a secondary manner.

Additional Data.—After each experiment the experimenter recorded his impressions of the children's behavior. The importance of the social aspects of the situation for the child was emphasized in these comments as well as the amount of dependence upon the experimenter, the importance of play for the child, the child's emotional expressiveness, his mood, the extent of his activity, and his talkativeness. These comments were found to be of considerable usefulness in giving a picture of the total impression which the child made upon the experimenter at the time.

Chapter III

GENERAL BEHAVIOR AND THE DYNAMICS OF THE FREE PLAY AND FRUSTRATION SITUATIONS

Before presenting examples of the experimental records (Chapter IV), we will describe for the general orientation of the reader the main types of behavior which we have found.

Types of Activities

Both the free play situation and the frustration situation produced two general kinds of behavior: (1) occupation with accessible goals, and (2) activities in the direction of inaccessible goals. We shall call the first free activity and the second barrier and escape behavior. Playing with the available toys and turning on the light are examples of free activity; trying to leave the experimental situation or attempting to reach the inaccessible toys behind the barrier are examples of barrier and escape behavior. Within each of these categories it is useful to differentiate further.

Free Activities

The free activity includes play with the accessible toys[10] and diversions[11] with nontoy objects.

Play with Accessible Toys.—Much of the free activity consisted in play with the accessible toys. We have limited the

[10] It is true, of course, that frustration occurred during the play with the accessible toys when the child was incapable of manipulating them as he desired, or when some desired toy was not available. This occurred so infrequently, however, that it has not been given special consideration. Also, it does not affect the comparisons between free play and frustration as it was present in both situations.

[11] This term *diversions* is not entirely fitting in the present connection, but we needed a word to distinguish the indicated activities from play with toys, and diversions seemed most adequate.

measurement of constructiveness of behavior to activities with this standardized play material.

Diversions, i.e., Occupation with Nontoy Objects.—These include the following:

1. Activities with the experimenter (other than those which are social attempts to reach the inaccessible toys, or to escape from the experimental situation): This behavior takes the form of conversation with the experimenter, helping him with his "lessons," and playing with him. It has been mentioned before that every effort was made not to encourage these contacts.
2. Activities at the window: climbing (e.g., upon the sill), and looking out.
3. "Island" behavior: Despite our continual vigilance in excluding any but standardized objects from the room, the children were forever finding additional material, e.g., a nail, a piece of string, or selecting for special attention some indifferent object in the room, as the light switch or a crack in the floor. Such objects not infrequently appeared to have the significance of a foreign object to the child, i.e., one not naturally connected with the rest of the situation, and as such to provide a refuge or an island of escape within the situation.
4. Looking and wandering about.
5. Disturbances (e.g., reactions to outside noises, lights failing, etc.).

The psychological meaning of diversions is ambiguous. Often, perhaps usually, they have as much of the nature of real play as play with the toys. Sometimes, however, diversions have the significance of an escape from the negative frustration situation. Occasionally the escape character of nontoy diversions is clear, as when the child abandons the toys and says, "I don't want to play any more. I want to go home," and then, upon being prevented from leaving, turns to the window and talks about the things he can see outside. Often, however, it is impossible to determine if the shift to diversions with nontoy materials is of this nature, or if it merely indicates a small change in the relative strengths of positive valences. Upon occasion it is obvious that the shift does not indicate that play has become disagreeable, but that diversions with nontoy material are for the moment more attractive. Occasionally even the attempt to leave the experiment is not an escape from a negative situation, but a change of

interest to a more positive occupation, such as going to the nursery school for orange juice.

Because of this ambiguous meaning of diversion with nontoy objects, we have treated them separately, as presumptive escape behavior. It will be shown later that for theoretical reasons, escape behavior should occur more frequently in the frustration situation than in the free play situation. If this is true, one would also expect that the presumptive escape behavior would occur more frequently in frustrating situations than in free play situations. There are some indications that this is actually the case.

Barrier and Escape Behavior

Attempts to gain access to the toys behind the barrier, and attempts to leave the experimental situation will be designated by the terms barrier behavior and escape behavior, respectively. In both cases they entail either (1) actual physical approaches to the inaccessible regions such as lifting or climbing over the barrier, or kicking the door, (2) social attempts by means of requests, pleadings, coaxing, threats, etc., to get the experimenter to raise the barrier or open the door, or (3) passive directed actions such as looking at or talking about the inaccessible toys or the outside regions.

The attempts to reach the inaccessible toys, or to escape were very numerous and varied in character. The barrier and the locked door of the room could be experienced by the child either as a physical or as a social obstacle set by the will of the experimenter. Actually, in most cases both of these components were present. Accordingly, we find social attempts as well as physical attempts to overcome the barrier in one and the same case.

Physical attempts to overcome the barrier took the form of trying to lift the barrier, trying to open the lock, trying to climb over, pushing and kicking at the door, etc. Social attempts were manifold. The child simply looked at the experimenter, or he asked the experimenter to raise the barrier, open the door, or get him a toy. The child asked, commanded, or begged. If one of the approaches failed, he might use a different one.

Besides this "active" barrier and escape behavior, there occurred "passive" barrier and escape behavior. Instead of making "real" attempts to reach the inaccessible toys or to escape, the child sometimes merely expressed the wish. This was often in the form of stereotyped sentences such as "I want to go over there," which were usually uttered in a monotone with no expectant or commanding quality to the voice. This stereotyped expression of a wish was typical of barrier and escape behavior. In this same class of passive actions were "looking at" the inaccessible objects and talking about them with no request for them stated or implied. Such conversation frequently took the form of describing the objects to the experimenter or pointing out newly observed or obscure details.

Active barrier and escape behavior seems to predominate in frustration situations where hope has not been abandoned. The fact that the child would not be able to open the locks fastening the barrier and the door in case he made such an attempt, does not mean that this is realized by the child. He may think there is some way to overcome the obstacle, that he will be able to open the lock himself or, that the experimenter will let him have the key.

It may be mentioned that these observations resemble closely the results of Fajans (16) about the behavior of children between one and six years in a frustration situation.

In summary, psychologically we distinguish but two fundamentally different kinds of behavior, i. e., free activity, and barrier and escape behavior. Technically, however, we distinguish three kinds: (1) play, i. e., free activity with the standardized toys, (2) diversions, i. e., free activities with nontoy objects, and (3) barrier and escape behavior.

To classify behavior in this way, makes it necessary to disregard to a certain degree other classifications, which technically might be easier. For instance, not all cases where the child talks to the experimenter are classified under the heading of "activities with the experimenter." Instead they are classified according to the specific content of the communication: they are treated as barrier behavior if the child asks for help in getting the inaccessible toys, they are treated as diversions if the child engages in a general conversation with the experimenter, and they are classified as escape behavior if the child expresses his wish to leave. In other words, we have tried to classify the behavior in a psychologically significant way (See (56)).

Overlapping Regions of Activity

A subject can be involved in more than one activity simultaneously; e.g., he may ask to have the barrier raised while

swinging the fish line. In these cases we speak about overlapping regions of activity. They will be discussed in detail later (p. 154).

A type of overlapping situation of special importance exists between play regions and nonplay regions. We will call the play occurring in this situation secondary play. Behaviorally it involves the simultaneous occurrence of play and nonplay behavior, e.g., pushing the truck back and forth while talking with the experimenter on other nonplay topics. Primary play, on the other hand, occurs when the subject gives the play his complete attention.

Substitute Behavior

The passive barrier and escape behavior mentioned above frequently seems to have the nature of a substitute for playing with the inaccessible toys, or leaving the experimental situation. This was particularly true of conversation about the inaccessible objects. Active barrier and escape behavior also seemed sometimes to be a substitution; e.g., "fishing" through the barrier, throwing the accessible toys into the inaccessible region, identifying the accessible portion of the room as a part of the inaccessible region, etc. One way to prove whether or not these activities actually were substitute activities is the determination of their substitute value (49, 58, 61).

Emotional Behavior

Two sorts of emotional expression occurred: (1) there were "pure" emotional actions (See (12)), e.g., whimpering, whining, restless actions; (2) frequently there was a strong "emotional component" to barrier and escape behavior, play, etc. Thus the stereotyped behavior had an important emotional component, evidenced by kicking the door or the experimenter. This was frequently indicated by the exaggerated or passive nature of the actions and the quality of the voice. In no case did outright crying occur, because we were careful to avoid such a situation. This, by the way, was one of the technical difficulties of the experiment, namely to secure frustration which was not severe enough to cause a complete breakdown and crying.

We will discuss the emotional behavior in detail later.

Topology and Dynamics of the Free Play and Frustration Situations

The Sequence of Events and the Sequence of Psychological Situations

The sequence, duration, and frequency of the various types of behavior differ greatly from subject to subject, and in the free play situation and the frustration situation. Not all varieties occur in all children's records.

As an example of a sequence we present the behavior of subject 6 in Figure 16 and subject 9 in Figure 17. This gives the sequence and duration of the various types of activities in the free play situation and in the frustration situation.

Obviously, such a curve does not indicate why the individual changes from one activity to another nor why certain activities, like barrier behavior, occur in the frustration situation but not in the free play situation. To approach such questions of the conditions of behavior it is necessary to scientifically determine and represent both the situation which exists for the individual, and the state of the individual at the various periods; in other words, it is necessary to determine the life space.

Fajans (16), Dembo (12), Sliosberg (74), Lewin (49), Dembo and Hanfmann (13), and others have given a representation of the topology and the psychological forces for a great variety of frustration situations. These representations have been well in line with each other and have permitted the derivation of a wide variety of observable behavior, including frustration behavior in children of the same age range as our subjects. It seems, therefore, appropriate to see whether their representation can be adapted to our particular situation.

The structure of frustration situations, as of practically all other kinds of situations, is determined partly by certain "objective" physical and social facts ("alien factors"; See (50)) and partly by the state of the individual (his needs, ability, experience) at that time. The "objective" physical and social facts usually determine what variety of perception is possible for an individual at a given time; they are also a determining factor for the space of free movement of the child. In other words, these "alien," nonpsychological factors frequently can be treated

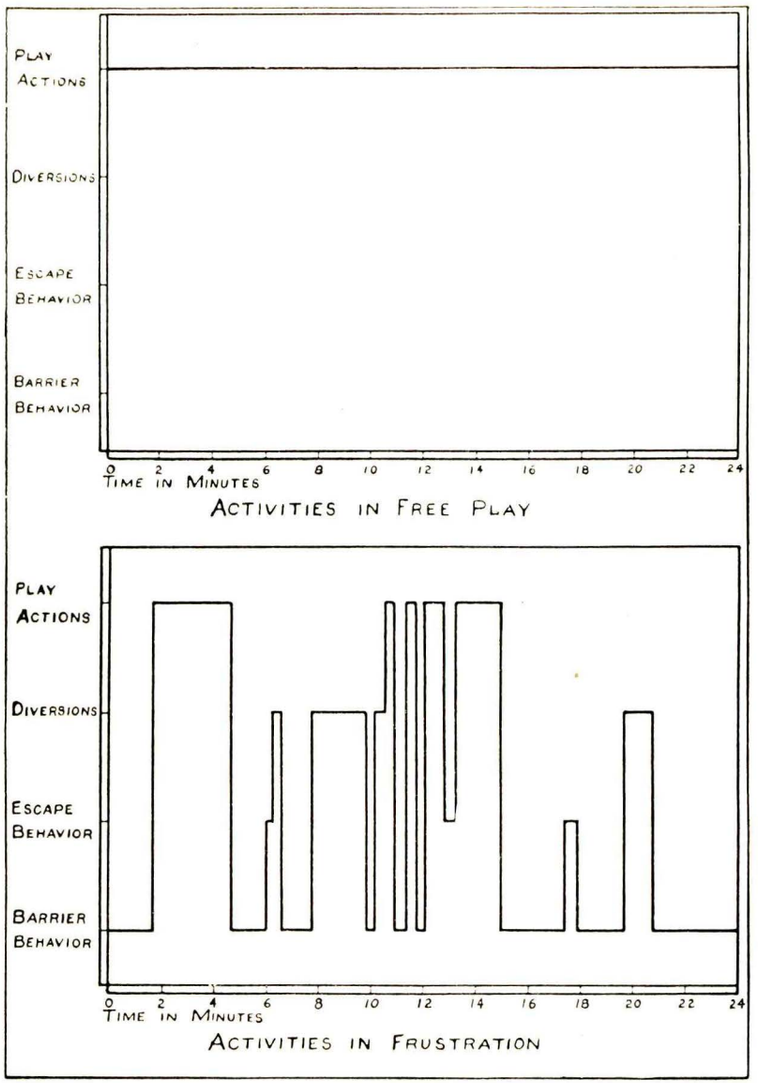


FIGURE 16. Sequence of Behavior of Subject 6 in the Free Play and in the Frustration Situation

as limiting conditions for the variety of life spaces which may exist within the setting, particularly when we have to do with

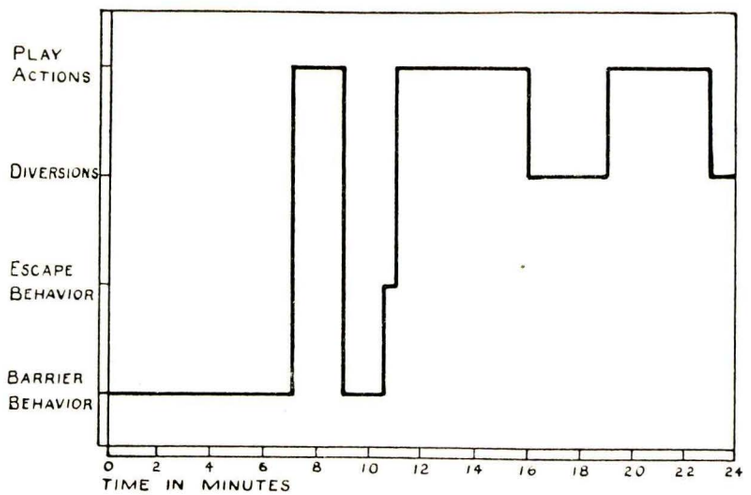


FIGURE 17. Sequence of Behavior of Subject 9 in the Frustration Situation
The activities in the free play situation correspond to those of Subject 6.

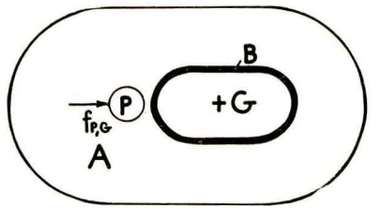
normal subjects. On the other hand the actual life space can be understood only by taking into account in addition the state of the individual at the time.

Topology and Forces in the Frustration Situation

The Basic Constellation.—The simplest way to approach the situation of frustration is probably to treat it as a particular case of a limited space of free movement (50). The space of free movement, i.e., the totality of accessible regions, may be limited either by an "inner" or an "outer" barrier or by both (12). In the first case a goal region (G) (region with positive valence) is surrounded by a barrier region (B) separating it from the individual (P) who is otherwise free (Figure 18). In the second case the individual is surrounded by a barrier, the goal being outside (Figure 19).

For most of our subjects Figure 18 seems to be an adequate representation for the early periods of the frustration situation, i.e., the subject sees himself separated from the nice toys without otherwise feeling himself to be in a prison-like situation.

The barrier has for the child either the character of an "ob-



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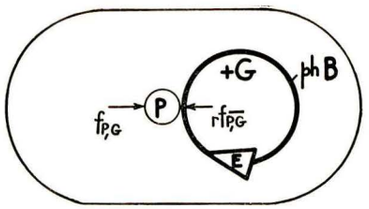


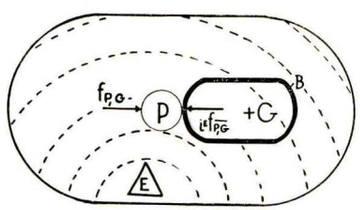
18a

FIGURE 18. Topology of a Frustration Situation

The barrier surrounds the goal. The person is otherwise free. *P*, person; *G*, goal; *B*, barrier; *A*, space of free movement; $f_{P,G}$, force toward the goal.

FIGURE 18a. Situation of Frustration Due to a Combination of Physical and Social Obstacles

The barrier between the person *P* and the goal region *G* contains a "physical" sector *phB* (partition) and a "social" sector (experimenter) *E*; $f_{P,G}$, driving force toward *G*; $rf_{P,\overline{G}}$, restraining force against entering *G*.



18b

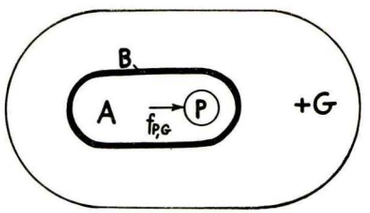


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FIGURE 18b. Situation of Frustration Due to the Power Field of Another Person

P, person; *G*, goal region; *B*, barrier; *E*, experimenter; $f_{P,G}$, force toward the goal *G* corresponding to the person's own wishes; $i^E f_{P,G}$, restraining force against entering *G* induced by *E*. The dotted lines indicate the powerfield of *E*.

FIGURE 19. Topology of a Frustration Situation

The barrier surrounds the person. *P*, person; *G*, goal; *B*, barrier; *A*, space of free movement; $f_{P,G}$, force toward goal.

jective," physical obstacle or the character of an obstacle which is created and kept in place by the experimenter, the latter case being a social barrier. The barrier may be a combination of both, in which case the simplest representation is given in Figure 18a where the physical and the social element in the obstacle are represented as two sectors of the barrier. This suffices to make it clear why the action toward the inaccessible toys takes the form of both a physical attack on the barrier and a social approach to the experimenter. A still more adequate representation is

given in Figure 18b. As long as the barrier has for the child an "objective" character the restraining forces ($rf_{P,\overline{G}}$)[12] which hinder the child's locomotion to the goal are not related to any particular person. If the connection between barrier and experimenter (*E*) is seen, these forces possess the character of being induced by his power field ($i^E f_{P,\overline{G}}$). From this it follows that the social path to the goal has two basic varieties: the child can seek to gain the co-operation of the experimenter or he can attack and undermine his power field (see (12)).

Fajans (16) has described in detail a situation where children of different age levels try to reach a goal behind a physical obstacle. She found that children of the age range two to six years usually perceive the obstacle at first as an objective, impersonal one, and that only later the social meaning of the situation becomes important. In our experiment the child saw the partition lowered by the experimenter. This made the social factors more apparent from the beginning, in spite of the experimenter's attempt to give an impersonal reason for his action.

Immediate Situation and Background: The Sequence of Situations.—In the beginning of the frustration situation the force $f_{P,G}$ in the direction of the inaccessible toys is usually strong. The child is in a conflict situation due to the opposing forces $f_{P,G}$ and $rf_{P,\overline{G}}$ (or $i^E f_{P,\overline{G}}$). This conflict is so dominating that the situation can be treated, in a first approximation, as composed mainly of two regions of activities: (1) the inaccessible region of playing with the toys behind the barrier, and (2) making attempts to overcome the physical or social obstacle (Figure 20a). The latter region of activity is identical with what we have called barrier behavior. The rest of the life space has at this time more or less the character of a background to these two regions of the immediate frustration situation.

If the child fails to make progress toward the goal the barrier and/or the goal region acquire an increasingly negative valence. In other words, in addition to the restraining force $rf_{P,\overline{G}}$ a driving force $f_{P,\overline{-G}}$ away from the negative region develops. If the strength

[12] The symbols for psychological forces are the same as those given in Lewin, *Measurement of Psychological Forces* (53). However, the symbol $f_{P,\overline{G}}$ is used instead of $\bar{f}_{P,G}$ to indicate a "force opposite to $f_{P,G}$."

FIGURE 20. Immediate Situation and Background. Sequence of Psychological Situations during Frustration for Subject 9

The "immediate situation" is indicated by light gray; the "background" by dark gray.

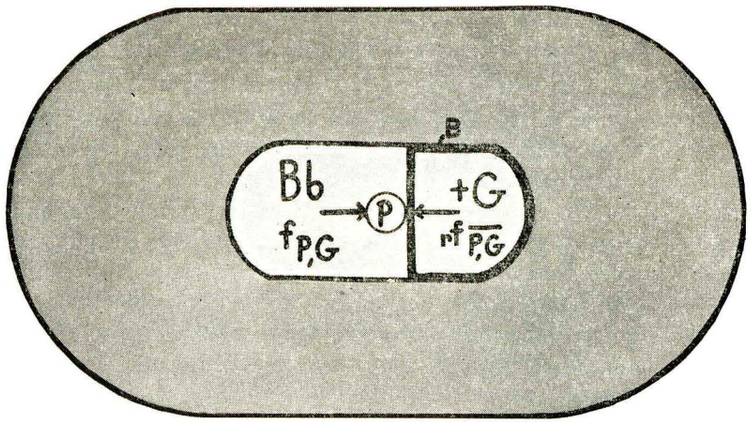


FIGURE 20a. First Attempts to Overcome Obstacle (7 minutes)

P, person; *G*, inaccessible toys; *B*, barrier; *Bb*, barrier behavior (attempt to overcome obstacles); +, indicates positive valence; $f_{P,G}$, force toward *G*; $rf_{\overline{P,G}}$, restraining force corresponding to *B*.

of this force becomes greater than the force $f_{P,-G}$ toward the goal the individual will withdraw, he will "leave the field." (Figure 20b). Fajans (16) has found that this withdrawal, with few

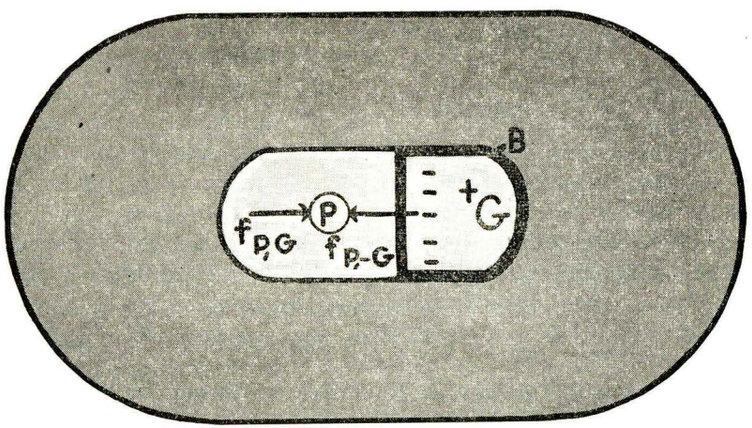


FIGURE 20b. Withdrawal from Barrier

$f_{P,-G}$, force away from *G* corresponds to the negative valence (−) of the failure to overcome the barrier.

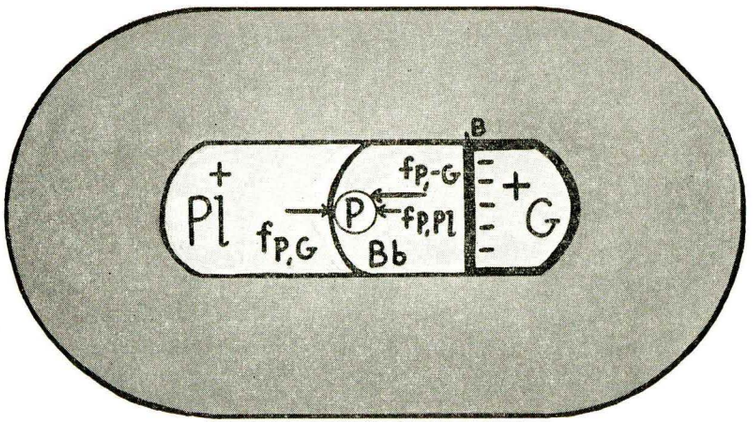


FIGURE 20c. Transition from Barrier Behavior to Play with Accessible Toys

Pl, play with accessible toys; *Bb*, barrier behavior; $f_{P,G}$, force toward inaccessible toys; $f_{P,-G}$, force away from failure to reach *G*; $f_{P,Pl}$, force toward *Pl*.

exceptions, has at first the character of a "temporary leaving of the field" and has given detailed data concerning the change from a temporary to a permanent withdrawal.

In our experiment, when the child withdraws (leaves the region of barrier behavior) he is confronted with the standardized

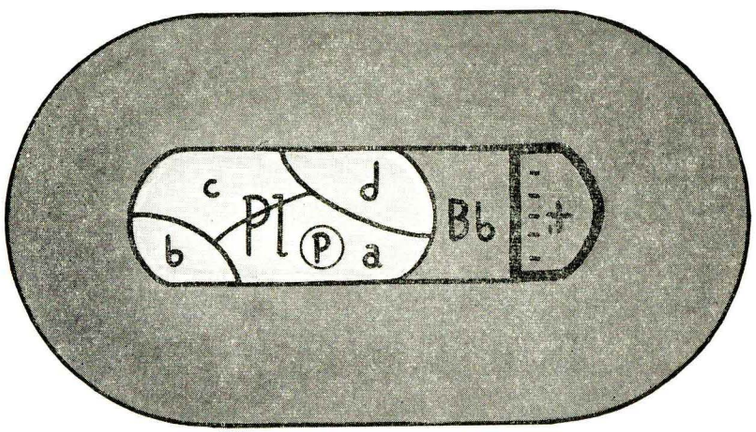


FIGURE 20d. Play with Accessible Toys (2 minutes)

a, *b*, *c*, *d*, activities with various toys; play (*Pl*) has become the dominant immediate situation, *Bb* part of the background.

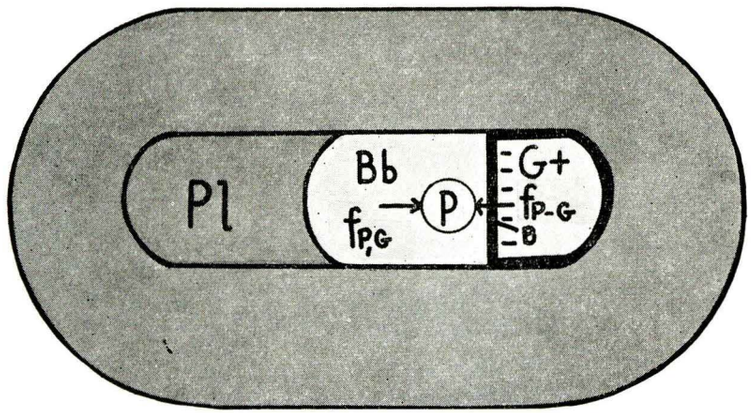


FIGURE 20e. Return to Barrier Behavior (1½ minutes)
The situation is the same as in Figure 20c with a slightly changed background.

toys, (Figure 20e). Child 6, Figure 16, for example, leaves the barrier behavior after 2 minutes, child 9 (to whom Figures 17 and 20 refer) leaves after 7 minutes. Both subjects then start to play with the toys. This is not surprising in view of the fact that playing with the toys has proved to have considerable positive valence in

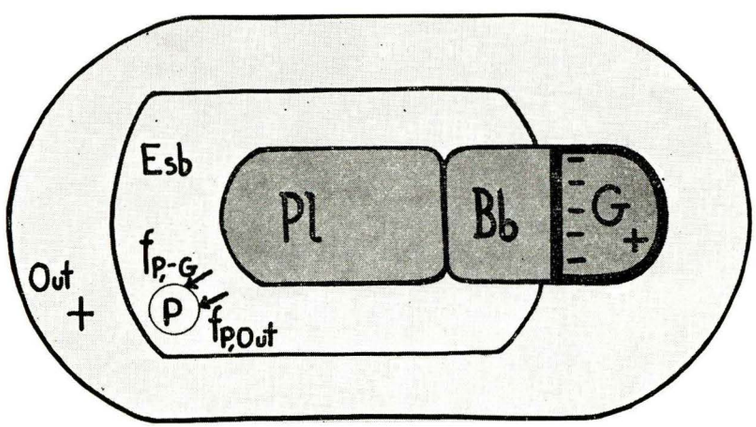


FIGURE 20f. Escape Behavior (½ minute)
P, person; *Esb*, escape behavior (tendency to leave room); *Out*, activities outside the experimental room; $f_{P,-G}$, force in direction away from the goal (*G* and *Bb*); $f_{P,Out}$, force toward the outside; *Pl* and *Bb* are now part of the background.

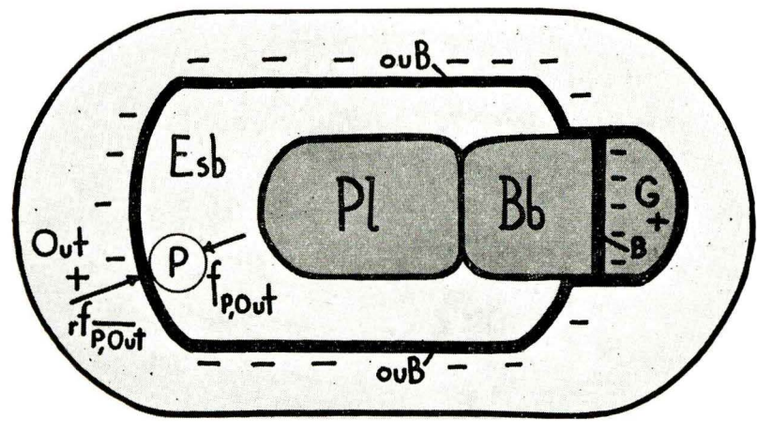


FIGURE 20g. Emergence of a Barrier against Escape
B, barrier around inaccessible toys; *ouB*, outer barrier prohibiting the child from leaving the room; $f_{P,Out}$, force toward the outside; $rf_{P,Out}$, restraining force opposed to $f_{P,Out}$.

the free play situation, although this valence was clearly less strong than that of the inaccessible toys behind the partition.

We would like to know the psychological characteristics of the inaccessible toys and the activity region "barrier behavior" (*Bb*) during the period of play with the accessible toys. Are they

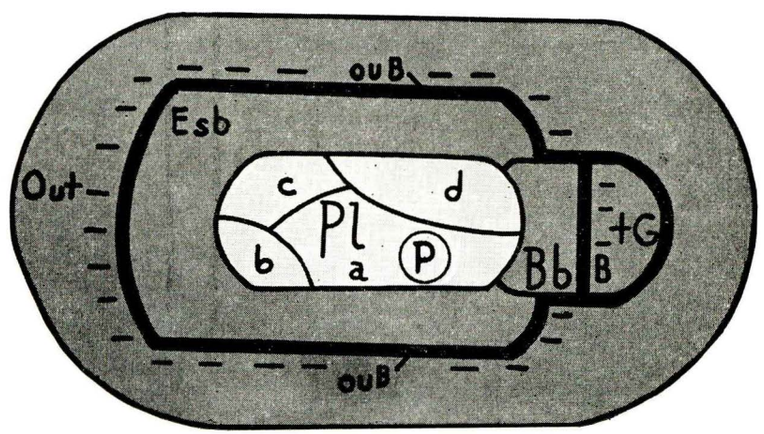


FIGURE 20h. Play with Accessible Toys (5 minutes)
The immediate situation corresponds to Figure 20d but the background is more differentiated, including now *Out*, *Esb* and *ouB*.

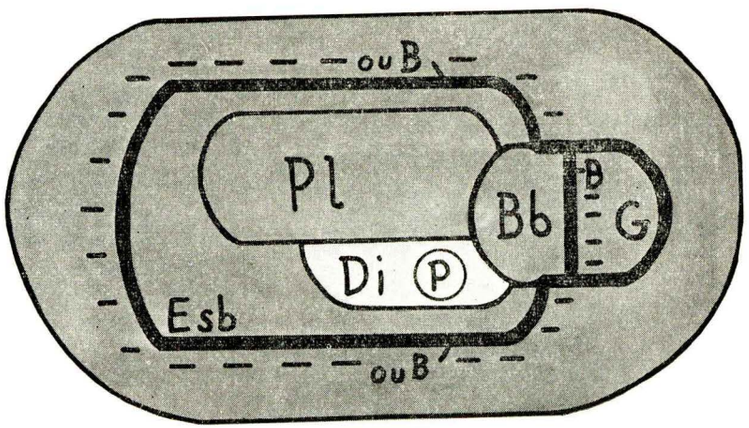


FIGURE 20i. Diversions (3 minutes)
Di, diversions (free activity with non-toy objects). (For designation of other symbols see Figures 20f and 20g.)

entirely forgotten, i.e., have they ceased to be a part of the life space? Or do they remain a part of the life space in the same way as when the child was located in the region *Bb*? This problem, obviously of prime importance for our study, is concerned with the effect of frustration on activities not directly related to

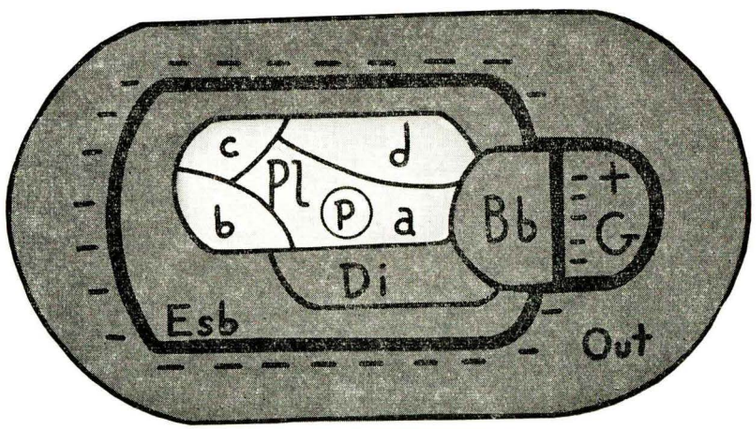


FIGURE 20j. Play with Accessible Toys (4 minutes)
For designation of symbols see Figures 20f, 20g, and 20i.

the inaccessible goal. Technically, it would be possible to explain the child's remaining in region of play (*Pl*) in the following way: the force toward the inaccessible toys ($f_{P,G}$) is smaller than the combined forces away from failure ($f_{P,-G}$) and toward the accessible toys ($f_{P,Pl}$) (Figure 20e) ($|f_{P,G}| < |f_{P,-G}| + |f_{P,Pl}|$). Actually, such a treatment would not be fully adequate. The region of playing with the inaccessible toys does not maintain the same weight in the life space as it did when the barrier behavior occurred. However, it does not disappear entirely from the life space, either. It seems to become a part of the "background" of the new immediate situation: playing with the accessible toys (Figure 20d). This seems to be the case at least soon after the child has changed from barrier behavior to play. (We will discuss the dynamic problems of these regions of low potency later in detail).

The play region contains several possibilities corresponding to activities with different toys and different kinds of play with the same toy. The child is free to move from one of these subregions to another.

After 2 minutes of play, child 9 returns to his attempts in the direction of the inaccessible toys. (Child 6 does so after 2 minutes also.) This is well in line with Fajans' results concerning "temporary withdrawal." The life space corresponds basically again to that represented in Figure 20a or 20b; the force of $f_{P,G}$, however, now being stronger than the force $f_{P,-G}$ resulting from the previous failure to overcome the barrier ($|f_{P,G}| > |f_{P,-G}| + |f_{P,Pl}|$). Probably, there is a slight change in so far as the possibility of playing with the accessible toys has now become a more definite part of the background (Figure 20e) than it was immediately after the partition had been lowered.

This time the attempts to overcome the barrier seem to increase its negative valence so quickly that after 1½ minutes $f_{P,-G}$ becomes stronger than the opposing forces and child 9 leaves the barrier region again. However, this time he does not withdraw to the play region, but tries by a more radical move to leave the experimental room altogether. He enters a region of activity which we have called escape behavior (*Esb*, Figure 20f). The attempt to leave may be partly due to a positive valence of outside activities such as play with friends in the nursery school. Usually in the frustration situation escape behavior was domina-

ted by the force $f_{P,-a}$ resulting from failure to reach the inaccessible toys. Nevertheless, the attempt to leave the experimental room presupposes that the region outside, which previously was at best a part of the background of the child's life space, has now become a definite part of the momentary situation.

When the child first tries to leave the room he may expect that the experimenter will allow this. At least he does not know that the experimenter will refuse. When the child realizes that he cannot leave, the situation has changed in an important aspect: an impassable barrier separates the child from the outside (Figure 20g). A situation is here established which corresponds to the second basic form of a frustration situation (Figure 19), i.e., the child is surrounded by a barrier. This barrier is partly "physical," partly "social" in nature.

The development of this situation is similar to that of the attempt to reach the inaccessible toys. The failure to overcome the obstacle leads to a negative valence and a corresponding force $f_{P,-out}$ which usually increases with time. In addition cognitively the barrier gains more and more the character of being impassable [this holds also for the barrier separating the inaccessible toys]. Dembo (12) and Fajans (16) have treated both aspects of such a situation in detail. Dembo has shown how, in a similar setting, the outer barrier (*ouB*) and the barrier (*B*) before the original goal (inaccessible toys) become one connected barrier. She has discussed in detail how this situation may lead to a state of pressure throughout the area inside the outer barrier.

This analysis makes it apparent that in our experiment we have to deal not only with a frustration in respect to the inaccessible toys, but in addition with a frustration in respect to leaving the room. Technically, it follows that we should not compare the action toward the inaccessible toys on the one hand with all other behavior on the other hand. It is psychologically more meaningful, for instance, when determining the intensity of frustration, to combine barrier behavior and escape behavior.

Child 9 gives up his attempts to escape after ½ minute. He does not make a new attempt to reach the inaccessible toys but starts to play with the accessible ones (Figure 20h). This situation corresponds somewhat to Figure 20d. However, now the background is more differentiated. The escape behavior region and the impassable outer barrier have emerged. This can hardly be without effect on the child, even though these facts

do not belong to the immediate situation, but to the background. In a way our whole experiment can be said to study the problem of how a "background of frustration" affects an immediate play situation.

After 5 minutes the subject starts activities with the experimenter of the type which we have called diversions (free activity with nontoy objects). The activity lies within the child's space of free movement and must therefore be represented as a region within the outer barrier (Figure 20i).

After 3 minutes the subject returns to play (Figure 20j). The situation is the same as that represented in Figure 20h with the possible difference that the background is now enriched by the possible region of diversions.

After 4 minutes the subject shifts again to conversation with the experimenter. The situation corresponds to the previous one (Figure 20i), with perhaps the difference that the region (*Di*) has become somewhat more differentiated.

Individual Differences.—So much for the development of the psychological situation of child 9 in the frustration situation. We will not discuss here the more detailed question of why the child shifts during play from one play activity to another. Obviously, the perceiving of a new toy, remembering a previously discovered activity, inventing a new play, satiation, etc., are of influence. (Some aspects of these problems will be dealt with later, p. 146) Furthermore, we can not assume that all the regions of activities which have occurred once remain unchanged as a part of the background in the child's life space for the rest of the experiment. Some regions, for instance the region of diversion, may temporarily or permanently disappear. Certainly, the regions of the background may show dedifferentiation or other minor or major changes in structure.

A child may realize some of the "possibilities" and limitations inherent in the physical and social setup correctly before actually entering every region of activity.

On the whole, however, Figures 20a to 20j seem to represent fairly well the more important aspects of the life space for the majority of our cases. The observed phenomena in regard to outer and inner barrier and withdrawal to other activities are nearly the same as those observed by Fajans and Dembo. Both found, also, that type of behavior which we have called diversions (Dembo uses the term "*Sondergebeit*").

On the other hand, we want to emphasize that the sequence in which the different immediate situations follow each other shows a great variability from case to case. Child 6, for instance, enters the same regions of behavior (Figure 16) as child 9 (Figure 17). However, the sequence and duration of the periods are different. Child 6 makes more frequent attempts toward the inaccessible toys, particularly during the latter part of the experiment. Escape behavior occurs rather late.

In the frustration situation, nineteen of our thirty subjects show all the activities represented in Figure 20a to 20j. Ten subjects did not show escape behavior; one subject showed neither escape behavior nor diversions.

Topology and Forces in the Free Play Situation

The psychological situation in the experimental setting which we have called the free play situation is comparatively simple. In four cases only play occurred; in fourteen cases, play and diversions, and in the remaining twelve cases in addition escape behavior occurred. This means that in case of child 6 (play only) the situation can be represented for the total duration of the experiment (free play situation), by Figure 21a which shows play as the immediate situation with probably no barrier in the background. In fourteen cases, the immediate situation corresponded sometimes to Figure 21a, and at other times to Figure 21b containing play behavior (*Pl*) and diversions (*Di*). In the rest of the cases, the situation corresponding to Figure 21c occurred at one time or another (quantitative data are given later; see p. 86). This implies that in the latter cases a psychological sit-

FIGURE 21. Sequence of Psychological Situations in Free Play

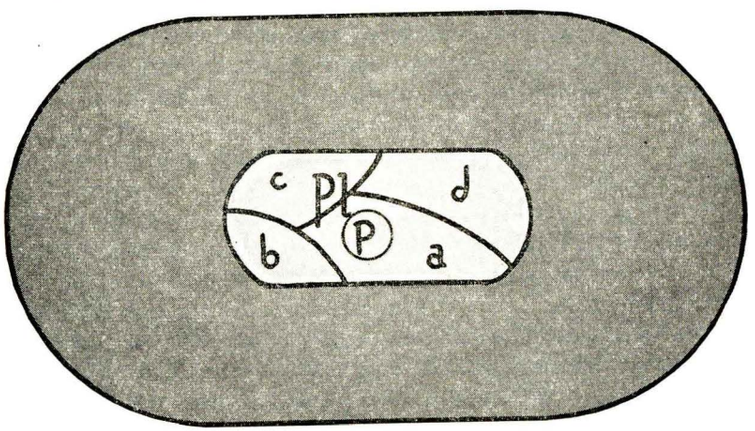


FIGURE 21a. Play with Accessible Toys

The "immediate situation" is indicated by light gray; the "background" by dark gray. *P*, person; *Pl*, play; *a*, *b*, *c*, *d*, various play activities.

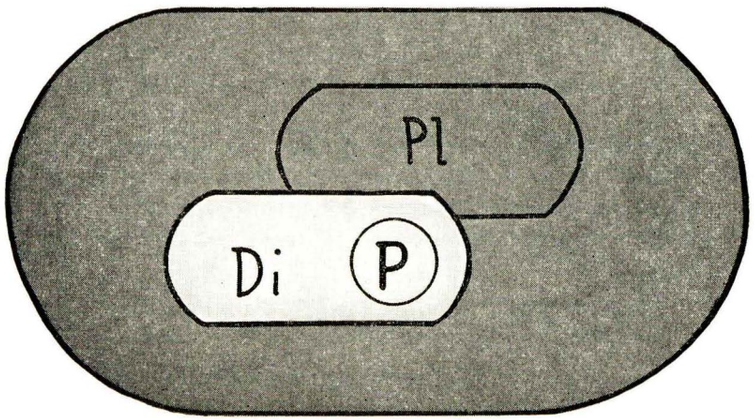


FIGURE 21b. Diversion

Di, diversion (free activity with non-toy objects). Play (*Pl*) is part of the background.

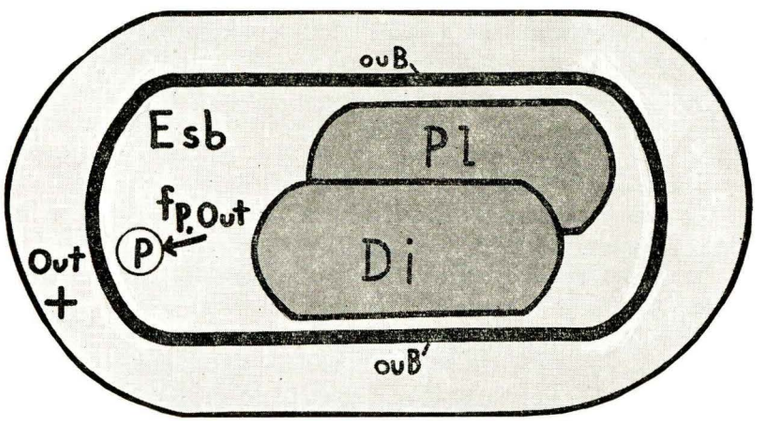


FIGURE 21c. Escape Behavior

P, person; *Esb*, escape behavior (attempt to leave the room); *Out*, occupation outside the experimental room; *ouB*, outer barrier; +, positive valence, $f_{P,Out}$, force toward occupation outside the experimental room. Play (*Pl*) and diversion (*Di*) are part of the background.

uation of frustration occurred even in the setting which we have called the free play situation. Even here, however, the forces $f_{P,G}$ and $f_{P,-G}$ which dominate the life space in the frustration situation do not appear.

In concluding the discussion of this section we may say that this study makes a comparison of behavior, particularly of the constructiveness of play, in the situations represented in Figure 21a on the one hand and Figures 20d, 20h, or 20j on the other.

Freqency of Various Activities in Free Play and Frustration Situations

Play, Barrier, and Escape Behavior

If the dynamics of the situation have been correctly analyzed one would expect a greater proportion of time to be spent in the barrier and escape regions in the frustration situation than in free play. Consequently play should occupy proportionately less time in frustration than in the free play situation.

The data bearing on these questions are presented in Tables 1 and 2 and the tabulation below. In Table 1 the time spent in different activities is shown for each child. Table 2 gives the mean times.

The decrease in the amount of time occupied with play in the frustration situation is very striking. Play in the frustration situation occupies about half as much of the experimental time as it does in the free play situation. The time spent in the barrier region is practically nonexistent in the free play situation, occurring only in the form of accidental preoccupation with the wall of the room, while in the frustration situation it occupies on the average over a third of the experimental period.

The increase in escape behavior in frustration, while not so marked as the increase in barrier behavior, is more than doubled and the critical ratio of the difference is 2.68 (99.6 chances in 100 that a true difference exists). This increase is in accord with expectations on the basis of our analysis of the dynamics of the situation given before.

Barrier and escape behavior may be combined and this value will later be used as a measure of the strength of frustration. The mean time occupied by such behavior increased from 69.2

Table 1.
Time in Seconds Spent in Different Activities in Free Play and Frustration*

Subject	Barrier Behavior			Primary Play			Escape Behavior			Activities with Experimenter			Island Behavior			Window			Looking and Wandering About		
	FPl†	*Fru*	*Fru–FPl*	*FPl*	*Fru*	*Fru–FPl*	*FPl*	*Fru*	*Fru–FPl*	*FPl*	*Fru*	*Fru–FPl*	*FPl*	*Fru*	*Fru–FPl*	*FPl*	*Fru*	*Fru–FPl*	*FPl*	*Fru*	*Fru–FPl*
1	20	295	+275	940	285	− 655	0	0		0	115	+115	0	0		0	265	+265	0	0	−125
2	20	290	+270	1,280	1,135	− 145	0	0		0	0		15	15	0	0	0	0	125	0	
3		960	+960	785	0	− 785				150	0	−150	25	0	− 25	0	0	0	0	0	
4	35	510	+475	945	370	− 575	355	375	+ 20	20	20	0	25	20	− 5	0	70	+ 70	60	75	+ 15
5		680	+680	1,440	550	− 890	0	55	+ 55	0	50	+ 50	0	105	+105	0	0	0	0	0	
6		650	+650	1,360	295	−1,065	0	180	+180	0	205	+205	0	95	+ 95	80	15	− 65	0	0	
7		185	+185	1,345	1,160	− 185	80	10	− 70	15	0	− 15	0	15	+ 15	0	0	0	85	0	+ 85
8	35	705	+670	615	565	− 50	95	275	+180	45	230	+185	625	60	− 25	60	180	−445	25	40	+ 25
9	145	535	+535	1,140	750	− 390	0	135	+135	55	115	+ 60	60	0	− 60	0	0	− 60	20	25	+ 5
10		405	+260	1,095	715	− 380	35	295	+260	245	160	+ 85	125	80	− 45	0	35	+ 35	20	10	− 10
11		370	+370	970	420	− 550	0	295	+320	15	25	+ 10	0	140	+140	0	0	0	190	10	−180
12		615	+615	890	0	− 890	0	320		0	330	+330	50	0	− 50	0	0	0	5	0	− 5
13	10	660	+650	1,375	310	−1,065	0	0		0	65	+ 65	40	40	0	0	20	+ 20	15	80	+ 65
14	30	300	+270	1,370	365	−1,005	0	245	+245	0	65	+ 65	30	265	+235	10	175	+165	0	15	+ 15
15	20	270	+250	1,290	355	− 935	90	415	+325	20	180	+160	20	155	+135	0	35	+ 35	35	30	+ 30
16		475	+475	1,275	750	− 525	50	20	− 30	45	95	+ 50	0	95	+ 95	35	0	− 35	35	5	− 30
17		420	+420	1,405	995	− 410	0	0		0	0		0	10	+ 10	0	0		35	15	− 20
18		240	+240	1,340	1,015	− 325	25	105	+ 80	15	0	− 15	60	80	+ 20	0	0		0	0	
19	40	655	+615	960	240	− 720	260	95	−165	50	90	+ 40	20	305	+285	65	65	0	0	40	+ 40
20		430	+430	1,415	760	− 655	10	155	+145	0	95		0			15	0	− 15	0	0	
21		860	+860	1,300	300	−1,000	0	0		0	280	+280	0	0		0	0		140	0	−140
22		590	+590	1,330	745	− 585	10	0	− 10	70	75	+ 5	30	30	0	0	0		0	0	
23	105	650	+545	660	640	− 20	95	135	+ 40	160	15	−145	380	0	−380	20	0	− 20	20	0	− 20
24		720	+720	1,400	445	− 955	0	45	+ 45	60	145	+ 85	40	85	+ 45	0	0		0	0	
25	20	780	+760	1,165	400	− 765	50	260	+210	60	0	− 60	65	0	− 65	30	0	− 30	50	0	− 50
26		390	+390	1,280	685	− 595	65	15	− 50	80	25	− 55	15	20	+ 5	0	105	+105	0	0	
27	55	350	+295	940	655	− 285	10	140	+130	435	145	−290	0	20	+ 20	0	130	+130	0	0	
28	30	645	+615	1,240	445	− 795	0	0		150	290	+140	0	0		20	60	+ 40	0	125	+125
29	20	340	+320	960	960	+ 0	340	115	−225	395	25	−370	105	0	−105	170	0	−170	60	0	− 60
30		140	+140	1,425	1,300	− 125	0	0		0	0		0	0		0	0		15	0		− 15

*Means are given in Table 2.
†*FPl* = free play situation; *Fru* = frustration situation.

TABLE 2

AVERAGE TIME IN SECONDS OCCUPIED BY DIFFERENT ACTIVITIES IN FREE PLAY AND IN FRUSTRATION

Activity	Mean Time		*Fru*/*FPl**	*Fru-FPl*	*Fru-FPl* / σ diff.
	Free Play	Frustration			
Barrier behavior	19.50	510.50	26.18	+491.00**	11.47
Primary play	1144.17	569.83	0.50	—574.34	8.88
Escape behavior	49.67	112.67	2.27	+ 63.00	2.68
Activities with experimenter***	76.83	95.50	1.24	+ 18.67	0.56
Island behavior	36.17	52.00	1.44	+ 15.83	0.77
Activities at window	37.67	38.50	1.02	+ 0.83	0.04
Looking and wandering	26 50	18.17	0.69	— 8.33	0.71

* *FPl*=free play situation *Fru*=frustration situation

** + indicates increase in frustration — indicates decrease in frustration

*** Other than social attempts to escape or gain access to the inaccessible regions

seconds in the free play situation to 623.2 seconds in the frustration situation; it increased in the case of all subjects. This indicates that, on the average, our technical arrangements provided frustration, as defined. However, the great individual differences in the amount of barrier and escape behavior made it necessary to divide the subjects into a "strong" and a "weak" group (p. 141) in regard to the intensity of frustration.

Diversions increase slightly in frustration situations but not enough to be of significance.

Activities not Directly Related to Frustration

We next turn to a consideration of the effect of frustration upon the time occupied with various free activities. The following tabulation presents the data for the various free activities as per cents of the total time occupied with free activities:

Activity	Free Play	Frustration
Primary play	86.6	73.6
Diversions		
Activities with experimenter (other than goal and escape behavior)	5.81	12 34
Island behavior	2.74	6.72
Activities at the window	2.85	4.97
Looking and wandering	2.00	2.35

The variability measures have not been computed, so only trends are suggested as follows: In the frustration situation a smaller proportion of the total time occupied with free activities is devoted to play than is the case in free play, while a greater proportion of such time is occupied with diversion, i.e., with the experimenter, with island behavior, with activities at the window, and in looking and wandering about.

As has been suggested before the experimenter can be an object of conversation or of social interaction unrelated to the frustration situation and thus may provide a means of escape from the unpleasant situation; further, being a potential path to the goal, some substitute satisfaction may be gained from contact with the experimenter. Island behavior is often a sort of escape, as is also standing at the window.

These data suggest that the force $f_{P,-G}$ away from frustration may lead not only to actions in the direction of outside regions (escape behavior), but also in the direction of what has been called diversions. It will be noticed that according to the data, the approach to the experimenter, even if it is not openly related to the wish to escape, seems in frustration to result frequently from the force $f_{P,-G}$. In addition, of course, the experimenter is frequently approached as a result of the force $f_{P,G}$ in the direction of the inaccessible toys (classified under barrier behavior).

Primary and Secondary Play: Length of Play Units

We have distinguished between primary and secondary play according to whether the subject is fully occupied with play, or whether it occurs simultaneously with other nonplay actions.

An analysis of the time occupied with secondary play shows that it increased from 2.3 per cent of the total experimental time in the free play situation to 8.9 per cent of the total time in the frustration situation. This increase is 4.0 times its standard error. If the analysis of the nature of secondary play made on page 146 is correct, these results mean that overlapping situations of play and nonplay are more frequent in frustration than in free play.

In Table 3 the percentage distributions of the number of play units of different lengths are given. These data indicate that, on the average, frustration has no influence upon the length of play units. Other data upon this point are given later.

We will return to these problems when discussing the effect of "strong" and "weak" frustration (See p. 147).

TABLE 3

NUMBER OF PLAY UNITS OF DIFFERENT LENGTHS EXPRESSED AS PER CENTS OF THE TOTAL NUMBER OF PLAY UNITS

Situation	Play Units								
	1 to 15	16 to 30	31 to 45	46 to 60	61 to 90	91 to 120	121 to 180	181	Number
All Subjects									
Free play	22.6	24.0	16.1	9.6	9.6	4.9	6.7	6.5	553
Frustration	22.0	21.7	14.4	11.2	10.5	8.7	6.9	4.7	277
Younger Subjects									
Free play	24.1	25.9	18.0	7.0	10.5	3.5	6.1	4.8	228
Frustration	21.5	20.4	18.3	14.0	7.5	7.5	4.3	6.5	93
Older Subjects									
Free play	21.5	22.8	14.8	10.4	7.9	4.8	6.1	6.7	325
Frustration	22.2	22.2	12.5	9.8	11.9	9.2	8.1	3.8	184

Chapter IV

THE CONSTRUCTIVENESS OF PLAY

EXPERIMENTAL RECORD OF ONE CHILD

An example of a case record will be given to acquaint the reader with the sequence and content of the course of events occurring during the experiment. This is the type of material with which we have had to work.

Child 22 is a girl fifty-three months old. Her IQ is 122 and her mental age 65.

The teacher in the preschool says of her: "She is never easily influenced by other people and she has definite ideas as to what she wants, or doesn't want to do.

"There is a tendency for her to feel and say, 'I can do it better than you.' On one occasion she commented, 'Your house is going to be a silly one. I'm making a better house.' She always seems to be trying to prove her superiority.

"Her standing in the group is about average, she isn't particularly popular nor does she seem to be unpopular. Her feeling of superiority or at least her attempt to compensate for her lack of social contacts probably is a handicap. She undoubtedly does not recognize her own part in failure and is unable or unwilling to criticize herself.

"To a great extent she is withdrawn in her contacts, but with strangers there is no outward appearance of shyness."

According to a record in the nursery school, her parents, when asked the question, "How do you usually discipline your child?" answered, "By sending her to her room or depriving her of something she enjoys very much."

The experimenter, in bringing the child from the nursery school to the laboratory got the impression that the child was emotionally sensitive and variable, e. g., in the nursery school she wanted first to put on her wraps by herself, then wanted to be helped, and before the experimenter started to help, did not want her to do so. Then she decided not to put on her wraps, but only her sweater. She insisted on it at first, but again was easily persuaded to put them on and finally ran out without buttoning her coat. Her broad, quick movements gave the impression of a very active, purposeful child, but actually they were probably expressions of impulsiveness.

She was strongly interested in social relationships; when alone with the experimenter for the first time she was more interested in her than

in the surrounding objects. To overcome this strong social interest, it was necessary to have a preliminary session with the child before starting actual experimentation.

Free Play Situation

The child and experimenter enter the room. The experimenter (E) takes the basket with the play materials and starts to distribute the toys. Before the experimenter finishes distributing the toys on square 1, the subject (S) takes the phone and shakes it. She says into the phone: "How do you do?" and examines the phone further.

The experimenter distributes the toys on square 3. Subject watches. She goes to square 3 but does not touch anything.

The experimenter distributes the things on square 2. Subject follows and watches. Experimenter says, "Nice things." Subject nods, "Yes."

The experimenter goes to the chair at the table and starts to take notes. The child chooses an occupation after two and one-half minutes of exploration.[13]

The record is given below on the right side of the page. Each unit of action is numbered consecutively. At the end of each unit is given the constructiveness rating and the length of the unit in seconds.

On the left side of the page the region of activity is indicated.

1. The child is in overlapping regions: play with toys and diversion with nontoy objects	1. S, "Here," to E, "you make me something from this clay." She takes clay to square 1 and asks, "Where are the other things?" (Referring to the toys present in the preliminary period). "I want you to play with me." The experimenter continues recording. Constructiveness 2; 45 seconds
2. Same as 1, except that region of play with toys has here a higher potency than in 1	2. The child throws clay on to square 2. "This is an elephant." Then finding a small peg on the floor, "Look what I found. I'll put it at his eye." Looks at it. Makes elephant sit up. Constructiveness 6; 70 seconds
3. Same as 2	3. The child starts to draw. "I'm going to draw a picture. Do you know what I'm going to draw? That will be a house. —That is where you go in." (Figure 22a) Constructiveness 7; 45 seconds
4. Disturbance	4. Someone moves in another room. S, "Who is that?" 10 seconds
5. Play with toys	5. S goes to square 1, shakes phone, and examines it. Manipulates phone, pretends conversation but does not use words. ("How do——" are the only words that E can distinguish.) Constructiveness 5; 30 seconds
6. Overlapping regions: play and diversion with nontoy objects	6. S sits down on chair and looks around. "I guess I'll sit here and iron." Repeats, then says gayly, "See me iron." Constructiveness 5; 45 seconds
7. Escape region	7. "Let's go down."
8. Play	8. S picks up phone. Constructiveness 2; 10 seconds
9. Play	9. She takes the iron and irons. Constructiveness 5; 5 seconds
10. Overlapping regions of play with toys and diversion	10. She picks up the teddy bear and pulls the truck and trailer. Hauls the doll, the phone, and the teapot. "Teddy bear, teddy bear, you stay right here." She shows off, talks, and looks at experi-

[13] In the free play situation the children frequently spent a few minutes in exploring the new situation before beginning to play. This orientation period has not been included in the comparisons between free play and frustration. The records begin with the first period following the orientation period.

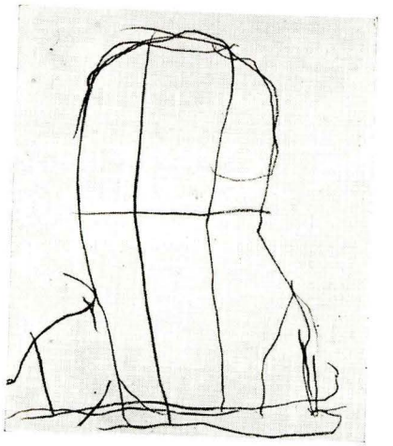


FIGURE 22a. Drawing by Subject 22, Free Play Situation, "A House"

with nontoy objects

menter. Pushes truck and trailer into middle of the room, makes a noise, "rrrr." "Oh, teddy! You are going to sleep." The load falls off the truck and trailer. S reloads teddy bear and doll, whispering. Constructiveness 6; 110 seconds

11. Same as 10

11. S goes to square 3, and pointing to the frog, asks, "Is that a salamander?" She takes the fish pole, fishes, and says, "See how I fish!" Then she asks about the boat, "Is it a paper boat?" Takes sailboat in hand asks again, "What is this?" but now recognizes it herself, "See, it's a sailboat." The sail comes off and she puts it back. She turns to the teddy bear and says, "Teddy bear, go on the boat and sail — no, stay there." She puts teddy bear on boat, takes fish pole, fishes for frog and sailboat, and then adds, "I'll take the pole and fish fishes." After a while she says, "I've finished," and picks up the duck. Constructiveness 6; 150 seconds

12. Disturbance

12. The real phone rings in the other room. S, "There is a telephone. Who will answer it?" She lies down on her side and looks about. 30 seconds

13. Overlapping of regions of play with toys and occupation with nontoy objects

13. S takes a crayon, then another one and draws back and forth. "Look! How many papers are here?" E answers, "Two." "How many?" S asks very loud and capriciously. Then she takes a new crayon and asks, "Do you know what I'm making?" E, "No." S continues drawing. "See what I'm making? Guess what I'm making. What is it going to be? It comes clear down. A 'pirate glass'." Shows drawing to the experimenter. "See! Do you know what I'm making now?" Makes a new drawing. S, "What's it going to be?" E asks, "A man?" S, "It's a glass." Sits looking and then takes a new crayon. "I won't tell you what it is. Doesn't it look nice?" Here is a 'stretch.' That is a 'stretch' door, 'stretch' (repeats 5 times more and more quickly). Looks at E, looks at wall, looks at square 1, square 3; looks at observer's window and then takes a crayon again. "Here's another line." (Continues drawing.) "See what this is going to be. This will be a green 'stretch.' This will be a sailboat." Shows. "What is it?" "A

duck. It's body is here. Do you know?" E, "No." S insists, "Yes you do." E, "What is it?" S, "You do too know." Looks at drawing. S, "Guess what it is going to be." S laughing, "An elephant." E, "Oh, I see." S looks again at her work and takes another crayon. S, "He will have a red eye and a red trunk, and his body goes this way and this way, and this way—doesn't it look pretty?" E, "Very." S shows the drawing again, "See it?" (Figure 22b). She makes big strokes back and forth, "See it?" Turns paper over. Looks at crayon, then sits doing nothing. Constructiveness 7; 485 seconds

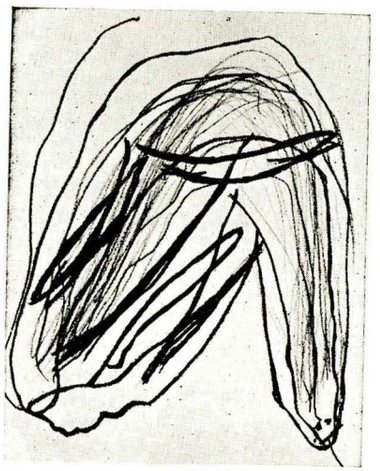


FIGURE 22b. Drawing by Subject 22, Free Play Situation "An Elephant"

14. Same as 13

14. S takes clay and starts to mold. "I want some more clay; this is not enough; I want some more. Don't you have more in the other room? Yes you do. I'll make a 'stretch'," breaking piece of clay. "You see I'll put the pieces together. I'll put this right here, see?" Constructiveness 3; 105 seconds

15. Same as 13

15. S goes to square 1, takes the phone, brings it to the experimenter to talk into. Shakes the phone . . . Constructiveness 3; 25 seconds

16. Diversion with nontoy objects

16. She counts on fingers, "1, 2, 3, 4, 5, 6, 7, 8, 8, 4." 30 seconds

17.	Same as 16	17. S says to experimenter, "You draw me a man. Here you do this." 30 seconds
18.	Escape region	18. She says, "I want to go back across the street." E, "I'm about through." 20 seconds
19.	Diversion with nontoy objects	19. S (examining papers of experimenter) "What is that, a four?" 10 seconds
20.	Play with toys	20. S draws with red pencil. Constructiveness 6; 15 seconds
21.	Play with toys	21. S rattles phone. "What does it say? Does the teddy bear make a noise?" (May be thinking that the noise in the phone is produced by the teddy bear.) Constructiveness 3; 20 seconds
22.	Play with toys	22. She goes to square 2, then carries teddy bear to square 1, "He's my sweetie!" Goes back to square 2. Constructiveness 3; 25 seconds
23.	Overlapping regions; play with toys and diversion with nontoy objects	23. S brings the teddy bear to E's table, leans over the table, and says, "He is going to watch you. Ha! Ha!" Places teddy bear on E's paper, interfering with his work. "I have a bigger teddy bear, I have a bigger one than you. Can the teddy put his legs up? Here teddy, I'll put the teddy up." Puts chair on experimenter's table. Excited about putting teddy on chair. Talks excitedly about putting teddy bear on chair. "Teddy bear is a nice teddy." The teddy bear falls off the chair. S warns, "Teddy bear don't get in the water! Stay here, stay here. Sit here and watch mother iron. Oh yes, you may, you may." Then addressing the E, "Is this a rocking chair?" E replies, "Something like a rocking chair." "I'll iron and you can watch me, Teddy." Sits before ironing board on chair. Has truck and trailer, iron, cup, saucer, and teapot, on ironing board. Rocks herself. Constructiveness 6; 215 seconds
24.	Escape region	24. Asks the experimenter, "Are you almost through?" 10 seconds
25.	Disturbance	25. S falls from chair. E, "All right, you didn't hurt yourself." 10 seconds
26.	Play with toys	26. S says, "Let's go clear over here." She brings the chair to the table of E, also the ironing board. Leans back in chair showing off and says, "Teddy bear walk, walk, walk." She dumps some of the things on the floor. Goes back to square 1 with ironing board. Holds it up, yells, and dumps more things. She says, "I'm having fun!" Sings as she carries ironing board about. Brings iron to table. Replaces other things, teddy bear, iron, cup, saucer, "Teddy bear, teddy." Sits on chair before the ironing board and rocks. Constructiveness 2; 180 seconds

The experimenter gives the first leaving suggestion. "Do you want to go to preschool?" Subject, "No."

The experimenter gives the second leaving suggestion. Subject answers, "No, I want you to draw me a picture." Experimenter, "I will do it downstairs." Subject, "I want a picture here." Experimenter, "There is no paper." Subject gets paper, "Use this on the other side." She gets crayons for the experimenter. She asks, "Where is the other one?" Gives another crayon to the experimenter. Subject says, "Draw me a man, a lady, a baby or an elephant. Name something else bigger. Make a chair." Stands watching the experimenter draw. She continues, "Make a lady sitting in the chair, and something here. Make another chair with a man sitting on it with a baby. Make a little girl. Make her eyes."

The experimenter gives the third leaving suggestion. Subject, "No, make a little girl."

The experimenter gives a fourth leaving suggestion. Subject, "I'll take all my pictures. Oh! Give them to me. I want to give them to mother and daddy."

The child and experimenter leave.[14]

Frustration Experiment

Prefrustration Situation.—The child and the experimenter enter the room. Subject goes to the doll house, but does not enter. The experimenter says, "You can play with anything you want," and shows the child how to enter the house and how to dial the phone. Standing in front of the house, subject takes the bunny, and says, "Here is the bunny." In the house she picks up the phone and shakes it. She comes out of the house and goes to the lake. She looks into the water and laughs. She asks, "What is in the water. I'm afraid." The experimenter shows her the boats and other lake toys and pushes them about. Subject watches. The experimenter goes to the table and shows subject that the big teapot has water in it, and how to pour it. The experimenter leaves subject occupied at the table. Subject returns to the lake. "Mr. Tadpole, go on,"

[14] This experiment lasted about thirty minutes; as usual for the quantitative data only the first twenty-four minutes after the orientation period were used.

she says to one of the toys and then picks up the frog. She pushes the frog and the swan into the water and says as she sees the floating duck, "How did Mr. Duck get in?" Subject takes the balloon and brings it into house, saying, "I'll put this in my house." After half a minute, she looks out of the door. "Here I come." She puts the lights out and comes out of the house. She goes to the lake. Here she picks up the fish pole, but says, "Now, I'll go home. I have to go into the house to turn the light on." In the house again she takes the phone, shakes it, and then dials, making it ring. She says, "Line busy—well, I guess I'll stay in." In about ten seconds she comes out of the house. "Now we will go outside and get some clothes and take them in to iron." She gets the clothes and brings them into the house. Again she announces, "I'll iron my clothes," and after she is partly through she shows them to the experimenter and remarks, "Isn't that pretty?"

Subject was definitely interested and involved in the play, and the experimenter considered it time to start with the frustration part of the experiment.

The experimenter takes the basket and starts to collect the toys. Subject asks, "What are you putting in there?" The experimenter avoids answering, and pointing to the new situation he is going to introduce, says, "We'll play on the other side." Subject, "What are you going to take?" She stands, watching the experimenter, while holding doll clothes in her hand. Subject continues watching very interestedly without saying a word for a minute. Then she says, "When will you bring them back in this room?" Not getting an answer from the experimenter, she states more belligerently, "That's all you are going to take!" The experimenter, who has just finished collecting the play material says, "And now you'll come." Subject protests, saying, "You better get out of here now," but she follows the experimenter over to the other part of the room and the partition is lowered.

Frustration Situation

1.	Barrier region	1. S watches the experimenter lower the partition. She asks, "I will not play on the other side again?" The experimenter answers, "You can play here now." S faces the experimenter for about 15 seconds with hands behind her neck. 25 seconds
2.	Diversion region	2. S looks around. 5 seconds
3.	Play region	3. She goes to square 3 and examines sailboat and fish pole. Constructiveness 2; 15 seconds
4.	Barrier region	4. S stands at square 3 and looks at barrier. 5 seconds

5.	Play region	5. Turning to the play material on square 3, she takes the fish line and dangles it about sailboat. Constructiveness 2; 20 seconds
6.	Barrier region	6. S goes to the barrier and reaches through the meshes of the screen. 5 seconds
7.	Diversion region	7. She turns around, looks at the experimenter, laughs as she does so. 15 seconds
8.	Overlapping play and barrier region	8. S goes to square 3, takes the fish pole, and returns to the barrier. She asks, "When are we going to play on that side?" Experimenter does not answer. Then, in putting the fish pole through the barrier, S says, "I guess I'll just put this clear back." She laughs and says, "Out it comes!" taking the pole out again. Constructiveness 2; 35 seconds
9.	Diversion region	9. S walks to experimenter's table. 10 seconds
10.	Play region	10. S goes to square 2 and manipulates clay. Constructiveness 2; 10 seconds
11.	Barrier region	11. From square 2 she looks at the objects behind the barrier and says, "I do like the balloon," and then she asks, "Who put that house there?" E answers, "Some of my friends." She asks again, "Who put that over there?" 35 seconds
12.	Overlapping of play and barrier regions	12. She goes to square 2, takes the crayon, and starts to draw a picture. While drawing (Figure 23a) she says, "I'd like to play on the other side," and then, "I'll make a little lady." (Figure 23b) Constructiveness 6; 60 seconds
13.	Barrier region	13. S stops drawing and says, "When will we play there?" E says, "We have to play here." S asks further — "Not until tomorrow?" 25 seconds
14.	Play region	14. She draws again, lying down to do so. (Figure 23b) Constructiveness 7; 15 seconds
15.	Disturbance	15. Noises from the neighboring room are heard. S remarks, "I wish that noise would go away. I'm tired." 20 seconds
16.	Overlapping of regions of	16. Returning to drawing, S shows it to the experimenter. "What do you suppose that is?" "A

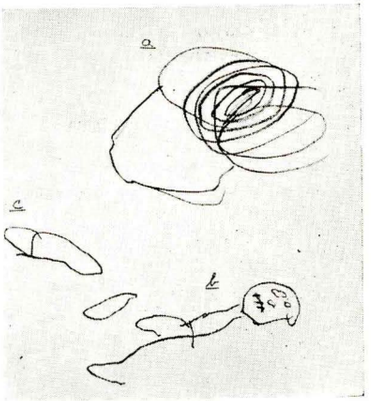


FIGURE 23. Drawing by Subject 22, Frustration Situation, (a) "Unnamed drawing." (b) "A little lady." (c) "A shoe"

play and diversion

shoe," enthusiastically. (Figure 23c) Then she turns over the paper on which she is drawing and says, "I can't stand that color. Do you like red, black?" Constructiveness 6; 60 seconds.

17. Play region

17. She suddenly goes to square 1 and puts the phone to her ear, but does not talk. Constructiveness 4; 20 seconds

18. Play region

18. S takes the truck and trailer and tries to put the ironing board on it. She says, "It won't go on." She pushes the truck and trailer and remarks, "I'll put something on to go." She hauls cup, saucer, iron, and teapot and tells in a sing-song way what she is doing. Then she continues, "Now, everything off. Now, we go to Chicago. Chug! Chug!" She moves the truck and trailer in circles. "Now, we'll go to Illinois." She carries truck and trailer around and loads it. She places the teddy bear on it. "Chug!" The teddy bear falls off the truck and trailer and she remarks, "Oh, teddy bear, he fell off." S puts the teddy bear on the truck and trailer again and moves it around in circles. "Chug! Chug! Teddy bear has to get off now." Talks about teddy bear on the truck and trailer, about doll, and where they are going and about the nice teddy bear. "Oh, teddy bear, fell off too—too,"

she says loudly, continuing to move the truck and trailer in circles. "Toot! Toot!" She moves the truck and trailer to square 3. Places the boat and duck on it and explains, "I'll put the boat here, a swan here." She moves the truck and trailer in circles and goes on with the sing-song. "Toot! Toot!" Then she takes all the things off the truck and trailer. She moves with truck and trailer to square 2, places crayon on it. "Toot!" moving the truck and trailer in circles and then to 2. Loads more crayons. Takes clay and says, "I don't want no clay." Then she leaves the clay, carries the truck and trailer to square 1, takes off trailer and says, "Now, all go to bed!" Constructiveness 7; 305 seconds

19. Overlapping barrier and play regions: Substitute behavior

19. S goes to barrier near the lake and tries to raise the barrier unsuccessfully. She stands a while looking through, and says, "I'll pretend this is the water." (Meaning the area just beyond the barrier.) She sticks fish pole through. "Look I caught a fish!" She laughs, "I'll take it off and put it on the boat!" Fishes through barrier again. She says, "I'll go back and get some real fishes." She speaks about fishes on the other side and starts to lift the barrier, but she can't do it. Laughs. She is a little embarrassed. She says, " . . . and that big truck and trailer and everything." Constructiveness 5; 100 seconds

20. Escape region

20. S goes to the experimenter's table, winds fish line in hand saying, "I'm not coming over any more. I am going home. I am going to school. I am going back to school. Now I am going out." "It's not me coming any more." Tries the experimenter out with play threats. "I've had enough of this business." She laughs. 105 seconds

21. Play region

21. S puts the fish line through a crack in the table. Gets interested in this and stops talking about going home. "Boat's sticking up, going through, whole fish pole," she says, (apparently meaning that the whole fish pole is going through the crack.) "I wish somebody would help me." She raps on the table, experimenter does not help. She pulls the line herself. "Won't you help me?" she says in a pained voice, but experimenter

		does not help. S gets under the table and laughs, comes up with the fishing pole, and laughs again. Constructiveness 3; 145 seconds
22.	Barrier region	22. S goes to barrier and tries to push it up. "Mr. Balloon wants it up. I want this up," she says kneeling by the barrier and pulling her fingers over the wires. "The truck!" 60 seconds
23.	Play region	23. She turns to square 1, "I guess I'll iron." Constructiveness 5; 20 seconds
24.	Overlapping barrier and play region	24. "I wish you had some clothes here." Sits and irons. "Go over and get some clothes. I want the balloon." Continues ironing. Constructiveness 5; 60 seconds
25.	Play region	25. "I'll just iron my own dress." Puts her skirt over the ironing board. "Now doesn't it look pretty." Constructiveness 6; 50 seconds
26.	Barrier region	26. Rocks, looks at barrier. "I wish you'd go and get the clothes for me. Why don't you get that big truck and trailer, the balloon and some clothes?" 65 seconds
27.	Overlapping barrier and play region	27. "Where is that old truck and trailer," looks for it. "It's back of me." Gets little truck. "Now this will go and get it." Pushes the truck under the barrier. "Now I haven't any car." Constructiveness 3; 55 seconds
28.	Barrier region	28. "My daddy won't like you." (Not angry.) 10 seconds
29.	Play region	29. Sings. Gets the small truck and trailer. Reattaches the trailer. "I put it wrongly on." Puts it on the ironing board. "Now too—too. It's going on the highway." Tips the ironing board and lets the truck and trailer coast onto the chair. Smiles. Constructiveness 7; 60 seconds
30.	Barrier region	30. Looks at the barrier. 5 seconds
31.	Diversion region	31. S approaches the experimenter: "Look at my hands, filthy!" The experimenter says, "We will wash them afterwards." 15 seconds
32.	Play region	32. Puts the truck and trailer on the ironing board again. "Racing off the highway he goes." Smiles. Puts the phone on the truck and trailer. Constructiveness 7; 30 seconds
33.	Play region	33. Takes the phone and talks into it, "Hello! Hello! (very loud) Hello! Yes, yes we are. Hm, hm!" Constructiveness 6; 40 seconds
34.	Barrier region	34. I want the rest of the phone. 5 seconds
35.	Play region	35. "Teddy bear can say hello." Holds phone to teddy bear's ear, then to own. "Hello!" Shakes the phone. Constructiveness 6; 40 seconds
36.	Overlapping play and barrier region: Substitute behavior	36. "I want the teddy bear to sleep. Where will be the bed for the teddy bear. Now you go to sleep, we're going to Minneapolis." Puts teddy bear on truck and trailer. "You can't go Mr. Dolly. Teddy bear does." Lies down and looks at teddy bear on truck and trailer. "Toot, toot." Leaves the truck and trailer at the barrier. Pushes the truck and trailer under the barrier, pulls back. Takes the teddy bear off the trailer. Smiles, talks to the teddy bear. "If you will sit in the back!" Carries the teddy bear around on the trailer. Moves the truck and trailer to the table of the experimenter. Says, "We are going to Chicago." Constructiveness 7; 175 seconds

The experimenter gives the first leaving suggestion. Subject says, "Let's go to school." She starts to leave.

Postfrustration Situation.—The experimenter says, "But first I will open this," pointing to the barrier. The experimenter goes to the barrier and lifts it. Subject watches and says, "Let's stay here now." She runs over to the other side of the room and goes into the house. Then she comes out with the phone base and says, "I'll fix this." She cannot do it and goes to the experimenter for help. "Put it on." The experimenter fixes the phone. Subject runs back to the house with the phone. Comes out, takes teddy bear, doll, ironing board, iron, and brings them all into the house. "Oh, the phone came off. Guess you did not fix it." Shakes the phone. Fixes the phone. "Mr. Balloon will sit outside of my house." Brings the phone to experimenter. "I wish this would be fixed so it would stay." Back to the house, plays with phone. "We have a phone like this." Rings the phone.

The experimenter gives the first leaving suggestion. Subject, "No, I want to play here." Takes the cabinet out.

The experimenter gives the second leaving suggestion. "No, I am not going." Goes to tea table set for a party.

Experimenter, "I have to go." The experimenter goes to the door and leaves the room. Asks, "Coming?" Subject, "No, not coming," but she then follows the experimenter.

Constructiveness Scale

Various Levels of Constructiveness with One Toy

From this record, and discussion of experimental procedure in other parts of this study, the reader will gain an impression of the richness of the play which occurred. It is possible to use such manifold material for many purposes. In the present connection, we have been most interested in phases of the play which are related to the creative aspects of the child's behavior.

For this purpose we have made an analysis of the play activities on the basis of their constructiveness.[15] One can distinguish variations in the type of play on a continuum ranging from rather primitive, simple, little-structured activities to elaborate, imaginative, highly developed play. We speak in the former case of low constructiveness; in the latter, of high constructiveness. In our experiment, constructiveness was rated on a seven-point scale (2 to 8) devised to be applicable to occupations with all of the toys.

To demonstrate the usage of this scale, we present a few examples of various constructiveness levels with the same toy, the truck and trailer. Our remarks are not definitions of the various constructiveness levels. They are intended merely to point to some characteristics of these specific examples.

Constructiveness 2

The toys are examined superficially.

a. Sits on floor and takes truck and trailer in hand. 10 seconds

b. Shakes iron once, teddy bear once, holds truck in hand, holds truck fingering it. 20 seconds

Constructiveness 3

The truck is moved to a definite place or from one place to another.

a. Phone, truck and trailer, manipulated and carried to window sill. 25 seconds

b. Bends over to truck and trailer, pushes back and forth. 15 seconds

[15] "Constructiveness" can be used in two ways. One can distinguish constructive activity as opposed to destructive. On the other hand, constructiveness can refer to the degree of creativeness, elaborateness, or complexity of an activity. In this monograph we will use "constructiveness" in the second meaning in an attempt to approach an operational definition.

Constructiveness 4

This is a somewhat more complicated manipulation of the truck.

a. Truck and trailer backed under chair. 15 seconds

b. Stands up. Picks up truck and trailer, detaches. Takes truck in hand, examines closely. 70 seconds

Constructiveness 5

This is definitely a more complicated and elaborated manipulation of the truck.

a. Truck and trailer unloaded, detached; pulled in circles, reattached, detached, reattached; pulled in circles. 45 seconds

b. Takes doll, puts on truck and trailer. "He doesn't sit up very well." "I lay the teddy down." They are both lying down on trailer as trailer is pushed back and forth.

Constructiveness 6

The truck is used as a means to haul other things.

a. Takes truck and trailer. "More things are going to be hauled." Puts cup, saucer, teapot on trailer. Talks to self. "Ride along, mister." To square 3. 60 seconds

b. "This is a fire truck." To middle of room . Around in middle, "You can load things in it. Mr. Duck! I'll haul Mr. Duck." 45 seconds

Constructiveness 7

The meaning of the play is an extensive "trip" or another elaborated story in which the handling of the truck is merely a part of a larger setting.

a. "Here's a car-truck, and it's going out fishing, so we have to take the trailer off. First, we have to go to the gas station. Toot! Toot! Now, he's going to the gas station. Ding, ding, ding." Gets gas. Now back for the trailer and the fish pole; child has truck and takes the motor boat. Attaches it to truck and trailer. "Hmmmm! Here he goes." Behind square 2 to 1. "Quack! Quack! Mr. Ducky come," (places on truck and trailer). Goes to 3. "Here's the sailboat." 225 seconds

b. "I want the teddy bear to sleep. Where will be the bed for the teddy bear?" Chooses the truck and trailer. "Now you go to sleep. We are going to Minneapolis." Puts teddy on trailer. "You can't go, Mr. Dolly. Teddy bear goes." Subject lies down on the floor and looks at

teddy bear on trailer. "Toot, toot." Pushes truck and trailer to barrier, then pulls back. Plays with truck and trailer and teddy. "Teddy bear, you will sit in the back." Pushes truck to table. "We're going to Chicago." Gets crayon. "I want some crayon to go." 175 seconds

Constructiveness 8

Play showing more than usual originality is classified here.

a. To square 1. Truck and trailer reattached. "I'll bring them here." Detaches truck, has it coast down trailer as an incline, reattaches. 30 seconds

b. To truck and trailer at square 1. Detaches trailer, uses it as incline against ironing board. Runs truck up, carries it up farther and farther, and lets it go. Looks to experimenter for approval, smiling. "Did you see it? Now watch it." Pushes truck across floor, big push. Hits E. "See how fast it goes!" "Chugs" it over to observer's window, looks underneath, "Chugs" to table, to barrier. 205 seconds

The Scale

Every play unit was rated using as data the combined records of the two observers. No attempt was made to rate the play as it occurred. Though we could now probably construct a more satisfactory scale, this has not been done. Exigencies of time required us to construct our instruments as we experimented, and because they served the purpose we have not perfected them further.

The scale was constructed in the following way: The play units of the first six children were transcribed seriately upon cards which were grouped according to the toy or group of toys involved. Three persons working together in conference arranged the play units for each toy in order of their increasing constructiveness. No attempt at independent ranking was made. The resulting order represented the consensus of opinion of the raters after discussion, disagreement, and compromise. It became evident that irrespective of particular *a priori* theories of "constructiveness," it was possible to agree upon the relative ranking of different play with the same toys.

The play units were briefly characterized and the characterizations set down in tabular form as in Table 4. Each rank order was assigned a numerical weight which in the final scale ranged

from 2 to 8.[16] This original table constituted the first constructiveness scale. It will be noted in Table 4 that the items are brief characterizations of very specific kinds of behavior; theory and general categories are absent. The records of the six children were then scored by assigning a numerical value to each consecutive play unit in the record in accordance with the rating given in the scale, weighted for the duration of the unit by multiplying by the time. The mean constructiveness of each child's play was determined by summing these values for the whole record and dividing by the total duration of play; i.e., mean constructiveness $= \frac{\Sigma[Cons\ (u) \times Dur\ (u)]}{\Sigma(Dur\ (u))}$ where

$Cons\ (u)$ = constructiveness rating of a play unit

$Dur\ (u)$ = duration of a play unit

$\Sigma(Dur\ (u))$ = total duration of play

Using the constructiveness scale as thus devised, one of the raters scored the remaining records. The items of the original scale covered the great majority of the units which occurred. However, it was inevitable that a number of unrated units should occur in the other records. When this happened, the three raters considered the new unit and agreed upon its placement in the scale.

The scale is given in Table 4. It does not include all of the different kinds of play with every toy. Our intention has been to include a sufficient number of examples to demonstrate the essential features of the scale at each level. This should facilitate the use of the constructiveness scale by others. The actual play units corresponding to each item including the doubtful cases are given in Appendix 2.

Reliability of the Constructiveness Scale

The sources of unreliability of this scale differ somewhat from those of most rating scales, because the ratings were not made at the time the behavior was occurring or from reminiscence afterward. The ratings were made on the basis of objective de-

[16] Originally ratings 1 to 8 were used, but differentiation between ratings 1 and 2 turned out to be impossible. Rating 1 was abandoned after about half the records were scored. All records for each child were scored in the same way. Since all crucial comparisons are between the free play situation and the frustration situation records of the same subjects, no possibility of error is introduced.

Table 4

Constructiveness of Play

Constructiveness	Truck and Trailer	Iron and Ironingboard	Phone	Doll and Teddybear	Chair	Cup and Saucer	Teapot	Clay	Crayons	Fishpole	Boats	Frog and Duck	Aggregate Play
2**		21. Touching	41. Shaking, rattling	55. Throwing	71. Sitting and rocking	77. Hitting table	81. Holding	93. Handling, fingering	109. Writing on shoe	127. Carrying about	144. Fingering, handling	151. Destroying	160. Picking up several toys, apparently at random
2	1.* Examining, casual	22. Carrying about	42. Examining, casual	56. Naming, calling attention to	72. Carrying and moving	78. Handling and fingering	82. Making noises, shaking	94. Carrying	110. Holding	128. Swinging, simple	145. Placing	152. Touching, taking in hand	161. Carrying several toys about room
2	2. Inadequate placement		43. Asking about and naming	57. Placing and sitting, casual				95. Throwing	111. Manipulating without examining	129. Winding fishline about hand; putting in mouth			162. Examining several toys in succession
2						79. Throwing		96. Eating	112. Throwing, without aiming	130. Throwing			
2			44. Carrying about					97. Stepping, stomping, making foot mark	113. Rattling crayons in box	131. Asking name		153. Examining; casual	
2										132. Asking where it was purchased			163. Placing or arranging several toys with care
3	3. Pushing back and forth	23. Asking how to make ironingboard stand up	45. Asking if noise is from teddybear, kitten, etc.	58. Holding carefully	73. Carrying to a definite place			98. Announcing intention to mold, without realization	114. Carrying to definite place	133. Looking for something to hook line to	146. Examing boat	154. Examination with comment on condition	164. Carrying several toys to a definite place, but with no play, when they are collected
3	4. Carrying to a definite place	24. Carrying to a definite place	46. Carrying to a definite place	59. Calling Teddy "My Sweetie" and carrying to definite place	74. Sitting and holding doll, teddy, etc., in lap			99. Breaking off small pieces	115. Examining; thorough				
3	5. Trying to detach trailer from truck	25. Taking ironingboard down and trying to erect, unsuccessfully		60. Spanking	75. Question about source of chair			100. Stuffing into key hole	116. Unwrapping crayons	134. Pole used for digging clay			
3		26. Ironing inadequate objects, teddy, saucer, etc.						101. Carrying to particular place		135. Swinging magnet; complex			165. Thorough examination of several toys
3												155. Pushing across floor	
4	6. Detaching truck from trailer	27. Successfully erects ironingboard		61. Putting teddy in teapot	76. Sitting on chair at ironingboard	80. Placing and removing cup from saucer	83. Gesture of pouring tea			136. Attempting to hook magnet into bolt in wall			
4	7. Reattaching truck and trailer	28. Simple ironing; casual	47. Phone to ear; no conversation	62. Has experimenter remove diaper			84. Setting table for tea	102. Assembling all pieces of clay in one place				156. Looking for water for frog and duck to swim in	
4	8. Pushing on wheels across floor			63. Kissing doll				103. Breaking into pieces and calling the pieces a "ball," a "roast," etc.					
4				64. Making doll and teddy sit					117. Scribbling without regard for color or form	137. Attempting to attach to boat, duck, etc.	147. Pulls boat over floor		
4												157. Poem about what frog says	166. Imaginative description of toys and planning of play while examining group of toys
5	9. Detaching and reattaching truck and trailer with skill	29. "Testing" heat of iron	48. Phone to ear, "Hello," very short conversation	65. Rocking to sleep			85. Gesture of pouring and drinking tea						
5	10. Pushing truck about with indication of larger meaning	30. Sitting at ironingboard and ironing	49. Whispering into phone	66. Having doll and teddy take naps				104. Naming after forming	118. Putting in the box with great care according to size, color, etc.		148. Ties boat to fish line		167. Assembling and piling objects with some ingenuity
5	11. Pushing across floor with truck noises	31. Ironing paper on the floor						105. Wrapping pieces of clay in paper	119. Making letters, "writing"				
5	12. Simple loading and pushing about	32. Taking iron to experimenter to show how hot it is							120. Picture design, letters, etc for experimenter, pond, etc.				
6	13. Hauling things to definite place	33. Carefully ironing piece of paper on ironingboard	50. Longer conversation	67. Having doll ride on frog, boat			86. Sitting in chair playing tea party	106. Modeling named objects from clay	121. Trying out all colorr systematically	138. Catching and eating fish		158. "Feeding" duck	168. Playing with each one of a group of toys, with combination into a single organized play activity
6	14. Telling story of what truck is doing	34. Removing dolls diaper and ironing it		68. Spanking teddy for sucking his thumb			87. Offering tea to experimenter, doll, teddy duck, etc.			139. Catching a particular sort of fish			
6	15. Imaginative play with truck	35. Ironing ribbon around teddy's neck	51. Phone conversation about "doggie" in phone	69. Having teddy watch while child irons; imaginative play					122. Stirring with crayons	140. Pulling truck about with fishline			
6		36. Ironing clay	52. Having teddy, etc., listen	70. "Arming" teddy with iron because he is naughty			88. Using clay and pegs in place of tea; pouring			141. Telling elaborate story about his fishing			
6		37. Ironing own dress	53. "Phone call" for experimenter				89. Stirring tea in teapot with fishpole, crayons		123. Naming unidentified objects after completion				
6		38. Placing iron on radiator to get it hot					90. Putting saucer on as lid for teapot		124. Naming unidentified objects; "it's something"; elaborate	142. Swinging duck and frog on fishline as part of imaginative play			
7	16. Using ironingboard as highway for truck	39. Attaching iron to window shade cord for "electric" cord; ironing					91. Elaborate tea party using ironingboard for table	107. Modeling more complex objects	125. Tracing objects		149. Using boats to transport things on lake, part of imaginative play		
7	17. Extensive "trip" to Chicago	40. Imaginative ironing play; taking clothes from line, etc.	54. Phoning to Preschool to have clay saved				92. Elaborate feeding of the: doll and teddy		126. Drawing of objects, elaborate details	143. Using line and magnet to pick up clay	150. Using boat to fish from		
7	18. Complicated story												
7	19. Using as police ambulance												
8	20. Using trailer as incline for truck to run down							108. Decorating cup with clay				159. "Catching" duck and letting "blood" run out	

*The numbers refer to examples from the records shown in Appendix A.

**See note, page *.

scriptions of the behavior given in the running accounts. The reliability of this scale depends therefore upon the following factors:

1. Accuracy of the Records of Behavior: The usual way of estimating this accuracy in terms of the extent of agreement between two observers is not applicable in this case, because the observers limited their attention to different aspects of the child's behavior with the intention of combining the records into a single, more complete account than would have been possible without such specialization. There would appear to be justification for the hope that our records are therefore more accurate reports of what the children actually did than records based upon the unspecialized observations of single observers.

2. The Accuracy with which the Scale Ratings were Assigned: This depends upon the exactness with which the records of the play units were matched with the proper items in the scale. As in all measurement, uncertain cases occurred frequently, and undoubtedly a considerable amount of judgment was involved of the same kind which enters into the scoring of the Stanford-Binet type of test. We sought to minimize the random errors in this case by having all the scoring done by a single person and by making the items refer to very specific actions. The latter precaution was of limited effectiveness inasmuch as the context of an action is frequently of great importance in estimating its constructiveness.

3. The Adequacy and Constancy of the Conditions: This factor does not affect the reliability of our scale as an instrument for measuring the degree of constructiveness of the actual behavior of the child. However, this factor has to be taken into account if one wishes to treat the actual behavior as a symptom (test) for the constructiveness of the particular individual, or if one wishes to measure the effect of frustration on constructiveness. We attempted to provide, on the one hand, a favorable situation for the demonstration of constructiveness in free play by making provision for normal unrestrained play and, on the other hand, for comparison, a moderately frustrating situation. Of course, we did not succeed in providing these situations in perfect purity and stability, but we have not chosen to make allowance for this inadequacy in any general, statistical way. We have attempted to deal with it as one experimental factor in connection with the problem of strength of frustration.

We have two sources of evidence as to the reliability of the ratings of constructiveness. One is the correlation between the constructiveness of play in different parts of the experimental period. For this purpose we have computed the mean constructiveness of play in each consecutive third (i.e., each consecutive 8-minute interval) of each experimental record in free play. The product-moment correlations obtained from the mean constructiveness of play in the various thirds of the period are as follows:

Third of Period	Correlation
1st and 2nd	$.72 \pm .06$
1st and 3rd	$.39 \pm .10$
2nd and 3rd	$.48 \pm .10$

It will be pointed out later that the psychological situation was not stable throughout the experimental sessions, and that it was necessary to take into consideration the changes which occurred. The above correlations are not primarily indications of the reliability of the ratings, but of the stability of the function involved. The correlation between constructiveness in the first and second third, i.e., .72, indicates, however, even if the reduction from 1.00 results entirely from unreliability of the constructive ratings that they have a reliability sufficient for the group comparisons here involved.

Another source of evidence of reliability of the constructiveness ratings involves the use of a method which approximates the so-called split-half procedure used in questionnaire studies. There the score obtained by using only the odd-numbered items is correlated with that obtained when the even-numbered items are used. In the present case play units of different lengths are scattered at random throughout the records. We have taken advantage of this to secure two independent estimates of constructiveness based on different play units. First we computed the mean constructiveness of each child's play based only on play units of the following lengths in seconds: 1 to 15, 31 to 45, 61 to 90, and 121 to 180. We then determined the mean constructiveness of each child's play on the basis of play units of alternative lengths, i.e., 16 to 30, 46 to 60, 91 to 120, and 181 seconds long or more. The correlation between these two independent estimates of mean constructiveness of play is $.79 \pm .05$. The estimated reliability of constructiveness based upon all the play units (Kelley (38), formula 158) is .88. This estimate of the reliability of the constructiveness ratings is also attenuated by the instability of the function rated, and therefore, is a minimal estimate of the true reliability of the ratings.

Validity of the Constructiveness Scale

In one sense we can say very little about the validity of the scale, for we have no criterion of the "constructiveness of play"

against which to test our ratings. In the beginning of the research, the only indication of validity which we had was the consensus of the opinion of three judges. In another sense, however, the entire monograph is concerned with this problem for we have attempted to define the nature of the variable called constructiveness of play, not in terms of a correlation with some equally poorly defined independent variables, but in terms of certain psychological characteristics of behavior which seem to be theoretically important (See next section) and for which an operational definition (the constructiveness scale) had to be developed. In addition, the relation of the constructiveness of a child, as rated by the constructiveness scale, to the age of the child (p. 114) and to other factors such as the primary or secondary character of play (p. 118) and the strength of frustration, may be valued as an important indication for the validity of the scale.

The Nature of Constructiveness (Qualitative Analysis)

If one analyzes the play units which have been classified under the various constructiveness levels, it seems possible to name a few factors underlying the rating of the three judges. Without discussing this problem here systematically and in detail we would like to point to some rather obvious factors.

Characteristics of Play Units on Different Levels of Constructiveness

The Richness of a Unit of Play Activity.—Generally, a play unit of high constructiveness is composed of a variety of different though related subparts. To hold the truck (Constructiveness 2) or even to carry it to a certain place (Constructiveness 3) is a relatively homogeneous activity while play of high constructiveness is full of rich details. For example, a unit rated constructiveness 7 may contain: taking the trailer off, going with the truck to the gas station, getting gas, going to the motorboat, attaching trailer, loading, and making a number of specific noises and sentences accompanying the action.

In other words a play of higher constructiveness is usually more differentiated and more inhomogeneous in regard to its subparts than one of lower constructiveness. It is not stereotyped and repetitive, but variable and evolving in a definite sequence of action. It seems to be possible to distinguish in this respect at least, poor, medium, and high differentiation of units.

In addition to this important aspect of play, a number of other factors may be mentioned which are more or less related to each other.

Specificity as Opposed to Vagueness.—The meaning of the play action can be definite and specific or rather vague and indeterminate. Frequently, play of low constructiveness is relatively vague. For instance, pushing the truck back and forth has a less specific meaning than driving to a gas station to get gasoline. Obviously, a richly differentiated play is usually more definite in its meaning.

Forming of Material.—Carrying, throwing, or eating clay is of a lower degree of constructiveness than modeling an animal. In the latter case the clay is used as a material out of which something is created. In a way, one can view the highly elaborated play with truck and trailer which we have mentioned as the building up of a larger meaningful whole from the small behavioral subparts (such as, making certain noises, carrying out certain movements) which are used as material.

Extent of Fantasy.—Some play takes into account the play material as it is presented in the *immediate situation* only. Play of higher constructiveness frequently brings in a wide range of facts and ideas which are not presented in the immediate experimental situation. Closely related to this aspect is what can be called the "originality" of the play, i.e., its deviation from the usual. For instance, to use the truck to "take fish from the pond to the house" is less original than the following play: "Detaches truck and trailer. 'Now, toot, toot; it's going on the highway.' Places truck on the ironing board and moves it along. Sings, 'Highway, highway.' Uses ironing board as an incline and makes the truck coast onto the chair. Smiles." Here the everyday, "given" character of the activity with the truck and ironing board is changed. The extent to which the child introduces new characteristics varies from almost complete disregard for the immediate situation (as when the child drinks imaginary tea from an imaginary cup) through the stages where the given and the created or imposed characteristics are equally involved (as when clay is used for tea in a real tea cup) to cases where real objects are used in novel ways (e.g., using a pencil as a knife to cut the clay). The more constructive play frequently changes

the meaning of the given toy material within a relatively wide range. The less constructive play keeps more narrowly to the given meaning. It seems to be one of the outstanding characteristics of the play situation (77, 74, 49), that the meaning of objects and events in this situation are more "fluid" than in non-play (serious) situations.

On the other hand, it is usually a sign of higher constructiveness if the play is more "realistic," in the sense of treating the play material "adequately" rather than inadequately. Take, for example, the following play unit: "Sits on the chair and 'irons' the teddy bear. Hums. 'Irons' saucer, holding teddy in hand. Gets down from chair and 'irons' truck and trailer on the floor, 'I'll iron the truck.'" This is a less "adequate" way of ironing than the ironing of the doll's garments.

In a highly constructive play, the fluidity and freedom of play does not lead to an inadequate treatment of the play material.

Constructiveness and the Characteristics of Developmental Levels

The differences between lower and higher constructiveness can be linked relatively easily to the behavioral differences between the developmental levels which we have discussed previously.

The most outstanding symptom of high constructiveness, namely, the richness of the play can be related to two outstanding characteristics of development: degree of *differentiation* and of *organization*. The more constructive play usually shows a greater number and variety of subparts. At the same time, these parts are governed by one idea, one inclusive plan; in other words, they are organized into a single unit of play. This idea may change somewhat during its execution. Nevertheless, there is a continuity of meaning, without which we could not speak of one unit of play. In some cases the main idea rules subideas which in turn govern immediate actions. The child may push the truck back and forth, being occupied with this activity as such, or he may do so with the intention of "getting it warmed up," or he may push the "fire truck" back and forth in order to "smooth the road if a fire alarm should come." In the second case the "degree of hierarchical organization" is greater than in the first, in the third case greater than in the second. The "pushing back and forth" in the third case is controlled by the intention to smooth the road, which in turn is determined by the more inclusive goal

of having everything well prepared for a possible fire. This unit of play can be said to have a more "stratified organization." We can leave the question open as to whether or not the degree of hierarchical organization regularly increases with increasing constructiveness. Certainly, the number and variety of subparts which are organized within one unit is by and large greater for the play of higher constructiveness.

Specificity as against vagueness is but another aspect of differentiation and as such is well known in embryology and child psychology. Forming material into definite objects can be viewed as but another example of organization.

Finally, fantasy and the adequate treatment of material are related to the size of the immediate situation, to the relation of *reality and irreality levels* within the life space, to the ability to rule the environment, and to the degree of *realism* of the child.

All of these factors were mentioned as essential aspects of the difference between developmental stages in the development of the child. Obviously, the tendency to be realistic, and the capacity to change the given meaning in an imaginary way counteract each other to a certain degree. It is to be expected that at different age levels these factors combine in different ways.

The qualitative analysis of the constructiveness scale indicates therefore that it may be useful as an instrument for revealing some of the aspects of behavior which seem to be characteristic of various developmental stages, in other words, as an instrument for determining development and regression. The quantitative data, which show the dependence of constructiveness of play on age and certain other variables bear out this expectation.

The Relation of Constructiveness to Age and Some Other Factors (Quantitative Analysis)

Relation of Constructiveness to Mental and Chronological Age

If one intends to use constructiveness of play as an indication of the developmental level of a child, and as an instrument for measuring regression, it must be demonstrated first that in normal children under comparable conditions, constructiveness increases with age. This is required by the operational definition of development and regression which has been stated previously.

In other words, constructiveness of play as determined by the

constructiveness scale should show a high correlation with age in a free situation. On the other hand, constructiveness is a characteristic of behavior which one would expect to show considerable variation from individual to individual of the same age. This means that constructiveness would be technically best fitted for our purpose if the correlation with age were high, but sufficiently below 1.00 to allow for individual differences.[17]

The product-moment correlations between mean constructiveness of primary play in the free play situation and mental age is .73 ± .05; with chronological age the correlation is .79 ± .05.[18] We have also calculated these correlations omitting the data for subjects 4, 19, 23, and 29. This has been done because these subjects showed a great amount of dissatisfaction in free play as indicated by a great amount of escape behavior. These data are given in Table 8. This means that these subjects were more or less frustrated in the free play situation. Inasmuch as it was our intention to obtain the best possible estimate of the relation with constructiveness of *nonfrustrated, satisfied* play, it was necessary to eliminate the subjects who did not satisfy these requirements. When this is done the correlation with mental age is raised to .81 ± .05 and with chronological age to .81 ± .05.[19] The mathematical regression of mean constructiveness of play upon mental age in months in the free play situation is linear; b = .06.

These correlations are important in so far as they establish the fact that constructiveness of play varies positively with age between 2½ and 5 years (30 to 82 months mental age). Although the constructiveness scale is a first attempt and may be greatly improved technically, the degree of correlation with chronological age is not far from the value which would appear to be optimal for our purposes.

The first prerequisite for using constructiveness of play for studying regression seems therefore to be sufficiently met, and the constructiveness scale is valid at least in the degree to which it measures something related to changes in age levels.

[17] A similar technical problem exists for setting up a scale for the "Maturity of Aspiration" (See 5).

[18] The data from which these correlations are compiled are given in the tabulation on page 48 and in Table 8.

[19] In the frustration situation correlations between constructiveness of primary play and mental age and chronological age are .47 ± .09 and .52 ± .09 respectively.

The correlation between mental age and constructiveness in the free play situation is the same (.81) as that between constructiveness and chronological age. One might have expected a somewhat higher correlation because intellectual capacity may be viewed as one type of constructive capacity. Actually, considering the reliability of the scale, the correlation is high. That it is not still higher may be because of the fact that intelligence as determined by standard intelligence tests at this age includes other factors besides constructiveness. In spite of the great amount of research which has been devoted to problems of intellectual development by means of test procedures, there is little agreement as to the psychological meaning of the characteristics revealed by the tests. Probably, "realism" which is closely related to "correctness" is valued more highly, and "imagination" (fantasy) less highly in an intelligence test than in our constructiveness scale. If this is true, the correlation found between constructiveness and mental age is in line with expectations.

The qualitative analysis of the constructiveness scale has indicated that it is based largely on the same characteristics (degree of differentiation, hierarchy of organization, realism, etc.) which seem to be essential for developmental levels. The correlations obtained can be considered as one indication, that this analysis of the scale and of developmental levels is essentially correct.

Constructiveness of Play and Length of Play Unit

The qualitative analysis has indicated that play of higher constructiveness is more highly differentiated and shows a more stratified organization than play of lower constructiveness. The actions which make up the parts of a differentiated play unit must take place in a definite temporal sequence. For example, it is impossible for the child to carry out the differentiated unit of delivering "meat" in the truck to "Mrs. Jones" without actually engaging in a series of actions in a particular temporal order, i.e., getting the meat, placing it in the truck, pushing the truck, and unloading the meat. Likewise, it is impossible to accomplish such a differentiated unit of action as detaching the trailer from the truck and using it for a bridge for the truck to cross, without executing the actions in a more or less definite order. Such actions require a longer minimum time for their execution than the less differentiated play units such as rocking

which can be completed very briefly, though they may be continued for an indefinite period.

If these considerations are correct, the duration of a play unit can be expected to be positively related to its constructiveness. The relation between length of play unit and constructiveness is given in Table 5. Although we have not computed variability measures, the trend of the means is definite for average constructiveness to increase with length of play unit. The mean constructiveness is 3.17 for play units 0 to 15 seconds in length, but increases to 5.81 for play units which are of 181 seconds or

TABLE 5

DISTRIBUTIONS OF CONSTRUCTIVENESS RATINGS, AND MEAN CONSTRUCTIVENESS OF PLAY FOR PLAY UNITS OF THE SAME LENGTHS IN THE FREE PLAY SITUATION

Constructiveness	Length of Play Units in Seconds							
	0 to 15	16 to 30	31 to 45	46 to 60	61 to 90	91 to 120	121 to 180	181+
8			1	1		1		1
7	1	1	1	5	7	3	5	13
6	11	15	16	15	15	9	14	11
5	15	35	26	11	8	9	8	5
4	15	27	17	12	9		1	5
3	30	33	20	5	9	5	6	1
2	60	28	11	6	7	1	4	1
Mean constructiveness	3.17	3.85	4.25	4.78	4.65	5.18	4.97	5.81

longer duration. This result is well in line with our expectations and can be viewed as further evidence that the nature of constructiveness as measured by the constructiveness scale is in harmony with our qualitative analysis.

The positive relation between length of play unit and constructiveness holds only for the means. Within each length constructiveness varies widely.

The cases of very brief, but highly constructive play, generally involve the use of language. Frequently the action is not completed because of an external interference or for some other reason, since only the intention is stated, accompanied by some gestures. It seems to be one of the essential characteristics of symbolic behavior, such as speaking or drawing, to telescope time

sequences, and to compress a long sequence into a few seconds. Such cases of incompleted action were given the same constructiveness rating as if the action had been completely carried out.

If an essential interference forces the child to make frequent shifts in activity, the constructiveness may, however, actually be lowered; the child may regress from the level on which he would otherwise play. Often a child who is dealing with rather new material, or with familiar material in a new situation, appears to develop more and more constructive behavior as he proceeds, and only after considerable time does he see the full potentialities of the material. Interruptions before these potentialities are realized, will in such a case, result in play of relatively low constructiveness.

Even after the child has become familiar with play material frequent interruptions are likely to lower the constructiveness of his play. In order that a differentiated and highly organized play may evolve, the child must be able to develop a plan for a certain time period, or at least he must feel reasonably sure that he will have sufficient time at his disposal. In other words, this time perspective should be such as to give sufficient space of free movement in the psychological time dimension (psychological future). (See page 211; also (56.)) If interruptions have made him feel insecure in this respect, he may cease to start activities which demand more than a very short time for their execution. On the whole, this must result in a lowering of constructiveness. We will come back to this point when discussing the effect of frustration upon constructiveness.

To complete a relatively simple play action takes less time on the average than to carry through a more constructive unit. On the other hand, less constructive actions (such as rocking or swinging the fish pole) are more likely to be repeated over and over again. Technically, we have treated such a repeated continuous activity as one unit. This obviously tends to make the relation between constructiveness and length of unit less striking than it would be otherwise. On the other hand, such a continuous activity of low constructiveness, which has psychologically the character of repetition, will lead to psychological satiation, whereas the same amount of activity will not have this effect if embedded in a more inclusively organized whole (37, 45). Satiation is therefore more likely to lead to an early spontaneous stopping of a play activity of low rather than of high constructiveness.

To the extent that this occurs, it is true that interruptions operate to make for short play units of lower constructiveness rather than for long units on the average, but it is also true that play units of low constructiveness will be continued a shorter time before a change is made.

Constructiveness of Primary and of Secondary Play

It will be recalled that primary play is defined as play behavior in which all observable behavior is concerned directly with the play, i.e., the child is in the play region only. Secondary play is play behavior which occurs simultaneously with other nonplay behavior, i.e., the child is in overlapping regions of play and nonplay.

In secondary play the child is engaged in two relatively independent actions at the same time, such as swinging the magnet on the fish line and talking about the relative desirability of the inaccessible toys. His behavior in this case is determined by two sets of conditions: (1) his need to play with the fish pole and the position, weight, speed, and other characteristics of the magnet, pole, string, etc., which are important for the successful swinging of the magnet, and (2) his interest in the house and its size, color, shape, beauty, etc., which determines his conversation about it. We can say in such a case, that the individual is in two relatively independent but simultaneously existing psychological situations. In twenty-eight of the thirty-two instances in which both primary and secondary play were exhibited by the same subject, constructiveness is lower in the case of secondary play, usually by large amounts (See Table 6). The mean constructiveness in primary play is 4.54, in secondary 2.71 when only those subjects exhibiting both primary and secondary play are included.

The four cases in which secondary play is more constructive than primary play are all cases of substitute activity, in which play and barrier behavior are combined, e.g., fishing through the barrier as an attempt to obtain the inaccessible object, hauling the toys to the barrier on the truck, and putting them through while asking to have the barrier raised so the objects might be retrieved. In such cases there is functional identity between the secondary play and the primary directed action. These cases should, perhaps, be treated in a separate category, for none of the dynamic characteristics of usual secondary play hold here.

TABLE 6

CONSTRUCTIVENESS OF PRIMARY AND OF SECONDARY PLAY IN FREE PLAY AND IN FRUSTRATION

Subject	Free Play		Frustration	
	Primary	Secondary	Primary	Secondary
1	4.21		3.16	2.00
2	3.36	2.00	3.84	3.00
3	3.10	3.00		1.00
4	4.76	1.00	4.26	6.20
5	4.34		2.41	2.20
6	4.29	2.00	3.63	1.00
7	3.02	4.00	5.39	1.88
8	4.01		2.30	
9	3.81	2.00	4.21	2.53
10	4.14	2.27	4.57	3.68
11	5.14		4.94	1.27
12	5.36			2.00
13	6.06	4.32		
14	5.01	2.00	3.78	
15	5.79		5.10	2.00
16	4.44	2.31	4.12	5.00
17	5.26		4.56	
18	4.83		5.76	
19	5.36		3.48	
20	6.07		3.03	
21	4.87		5.10	3.39
22	6.45	1.71	5.87	3.11
23	5.45	3.67	4.21	1.59
24	6.78		3.89	3.00
25	6.27		5.64	3.00
26	5.80		5.01	2.87
27	5.31	2.00	4.75	1.56
28	6.22		5.34	6.00
29	4.47		5.09	2.00
30	7.57		4.11	

These cases are considered more fully later (p. 163). Except for subjects where substitute behavior complicates the issue, the mean constructiveness of secondary play is always lower than that of primary play.

In case of secondary play, two situations exist which are overlapping. These two overlapping situations are frequently of unequal importance. The main activity may be the conversation about the toys, while the swinging of the magnet is a minor repetitive action. On the other hand, the child may devote great care and attention to swinging the magnet in a definite pattern while making incidental remarks about the inaccessible toys.

It is convenient to handle these cases in terms of the concept of potency (*Po*) of the overlapping situations. The potency of any situation *S* (*Po*(*S*)) refers to its importance in determining behavior. It refers to the significance of the facts relative to the effect which they would have on the behavior of the person if the situation were the only one existing for the person at that time (54, 15). We can regard the potency of the total life space, i.e., all the effective facts, as equal to one; in case there are two overlapping situations (S^1 and S^2) $Po(S^1)+Po(S^2)=1$. (See 53, p. 201.) It is obvious that the potency of any one overlapping situation is less than maximal, (<1).

The extent to which forces corresponding to one of two overlapping situations influence behavior depends upon the strength of the forces and the relative potency of the situation. For example, with children in eating situations the force away from a negative food can be reduced for a child by reducing the potency of the eating situation. This is frequently accomplished by raising the potency of an overlapping noneating situation as when the father makes funny noises for the child's benefit while the mother easily feeds the child the previously rejected food.

It is probable that secondary play occurs only within a limited range of the potency variation of the play situation. If the relative potency of play is so low that the force in the direction of play activities is below the threshold required for overt action, no overt play will occur, and a nonplay episode will result. On the other hand, if the potency of play is so high, and that of nonplay activities so low that the force of nonplay activities is below the necessary threshold, no overt nonplay behavior will accompany the play, and primary play will occur.

The reason that the constructiveness of secondary play is below that of primary play will be discussed when we consider the factors determining constructiveness.

Summary

From the quantitative analysis three empirical correlations with constructiveness of play (*Cons* (*Pl*)) have been established:

1. *Cons* (*Pl*) $=F(M.A.)$; 1a. *Cons.* (*Pl*) $=F(C.A.)$. [*C.A.* means chronological age and *M.A.* mental age.] This establishes the validity of constructiveness as a characteristic of play at different developmental levels and as a possible instrument for measuring regression. The proposition 1a does not intend to imply that constructiveness is a function of mental age independent of chronological age. We do not have sufficient material to decide this question.

2. *Cons* (*Pl*) $=F(dur(Pl))$ [*Dur* (*Pl*) means the duration of play unit.] This relation is understandable in terms of the temporal requirements of differentiated behavior with hierarchical organization.

3. *Cons* (*Pl*) $=F(Po(Pl))$ [*Po*(*Pl*) means the relative potency of the play situation.] This is a somewhat generalized assumption based on our finding that constructiveness in secondary play is considerably lower than in primary play.

Chapter V

CONSTRUCTIVENESS OF PLAY IN THE FREE PLAY SITUATION AND FRUSTRATION SITUATION: GENERAL RESULTS

We turn now to the experimental results concerning our main problem, namely, the effects of frustration upon the constructiveness of play.

Average Constructiveness of Play in Free Play and Frustration

The mean constructiveness of the play of each child in free play and in frustration is shown in Table 7, together with the difference in constructiveness in the two situations. The same data are presented in the correlation chart, Figure 24. These data include all play, both primary and secondary. The mean constructiveness of play in free play is 4.99 constructiveness points and in frustration, 3.94 points. Twenty-five of the subjects regressed in the constructiveness of their play and five increased. The mean of the differences, i.e., constructiveness in frustration minus constructiveness in free play is −1.05 with a standard error of .24. The mean regression is 4.39 times its standard error. Stated in terms of mental age equivalents, i.e., in terms of the regression of constructiveness upon mental age, the mean regression amounts to 17.3 months of mental age.

For the ten younger subjects, 28 to 41 months of age, the regression is smaller than for the twenty older subjects, aged 42 to 61 months. In the former case, the mean regression is 0.58 constructiveness points, corresponding to a regression of approximately 9.6 months, and in the latter case it is 1.29 points, corresponding to regression of approximately 21.5 months. Proportionately, the amount of regression seems to be quite similar in the younger and the older group.

These data establish rather definitely the fact that a frustrating situation of the kind considered here reduces, on the average, the constructiveness of play below the level upon which

Table 7

Mean Constructiveness of Play in Free Play and Frustration, Including Both Primary and Secondary Play

Subject	Free Play	Frustration	Difference (*Fru-FPl*)
Younger Subjects			
1	4.21	2.56	−1.65
2	3.34	3.83	+0.49
3	3.08	1.00	−2.08
4	4.68	4.67	−0.01
5	4.34	2.36	−1.98
6	4.16	2.84	−1.32
7	3.06	4.94	+1.88
8	4.01	2.50	−1.51
9	3.72	3.68	−0.04
10	4.04	4.47	+0.43
Mean	3.87	3.29	−0.58
Older Subjects			
11	5.14	4.17	−0.97
12	5.36	2.00	−3.36
13	6.06	4.32	−1.74
14	4.95	3.78	−1.17
15	5.79	4.65	−1.14
16	4.34	4.30	−0.04
17	5.26	4.56	−0.70
18	4.83	5.76	+0.93
19	5.36	3.48	−1.88
20	6.07	3.03	−3.04
21	4.87	4.76	−0.11
22	6.20	5.33	−0.87
23	5.37	3.60	−1.77
24	6.78	3.79	−2.99
25	6.27	5.27	−1.00
26	5.80	4.14	−1.66
27	4.44	3.65	−0.79
28	6.22	5.56	−0.66
29	4.47	5.06	+0.59
30	7.57	4.11	−3.46
Mean	5.56	4.27	−1.29
All Subjects			
Mean	4.993	3.940	−1.053
S.D.$_M$	0.197	0.200	0.240

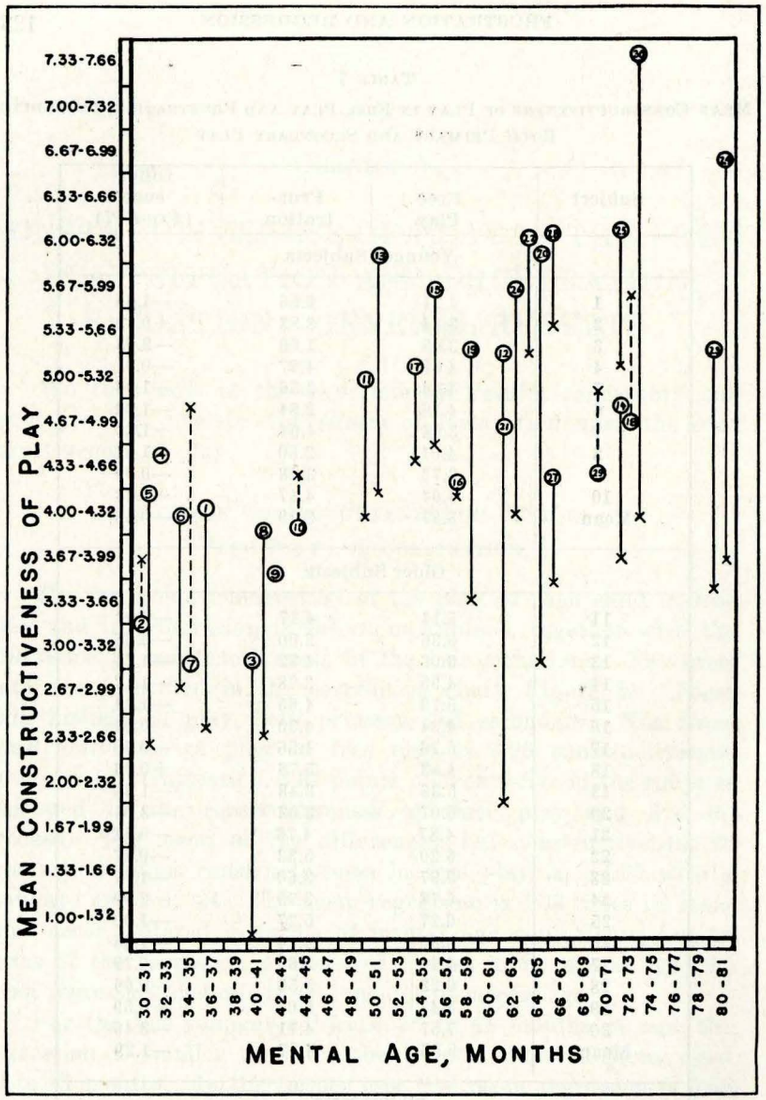


FIGURE 24. The Relation between Mean Constructiveness of Play and Mental Age and the Change of Constructiveness in the Frustration Situation. (1) The mean constructiveness of (primary plus secondary) play in the free play situation is indicated for each child by a circle. The number given is that of the subject as indicated in Table 1. (2) The mean constructiveness of play in the frustration situation is indicated by a cross. (3) Change in constructiveness from the free play to the frustration situation is designated by a solid line when constructiveness decreases in frustration, by a broken line when constructiveness increases. The absence of a cross indicates no change in mean constructiveness for that child.

it normally occurs in a nonfrustrating, free play situation. Before considering how this reduction in constructiveness is effected, it may be well to stress the fact that these crude results have a great deal of significance.

They show that frustration affects not only actions related to the inaccessible goal, such as attempts to find round-about routes or getting emotional and aggressive against physical or social obstacles, but that frustration may affect behavior in other regions of activity as well. The main expectation of the result of the experiment (p. 45) has been proved correct. More specifically, the result shows the importance of the total situation for promoting or hindering a child's creative achievement. Thus, our second expectation, namely, that constructiveness of play would be a useful instrument for measuring regression, has also been confirmed.

EXAMPLES OF PLAY IN THE FREE PLAY AND FRUSTRATION SITUATION

An example is given below to indicate the change of constructiveness of play of the same child (subject 24) with the same toys in the free play situation and the frustration situation. The order of occurrence of the units of play has been changed in order that play with the same or similar material in the free play situation and frustration situation may be placed side by side in parallel columns. (The initial number indicates the order in which the units occurred in the record.)

Free Play Situation	Frustration Situation
Fish Pole and Boats (Lower Constructiveness in the Frustration Situation)	
6, 7, 8. Child goes to square 3: "Now I'm going out. What's this? (fish pole). I'll let out more string like this. This is the way my daddy fishes. Oh, I caught a fish! Oh, I caught a fish!" Pretends to fish on square of paper. "Now I'll take my fish pole home." Goes to square 1. Back to square 3, seizes duck. "Now I catch a	21. Picks up fish pole, swings magnet while looking through barrier. Constructiveness 2; 25 seconds 4. Pushes truck to square 3; examines and manipulates boat, examines wet print it made. Constructiveness 3; 45 seconds 20. Turns to square 3; picks up sailboat and examines it carefully. Tries to put mast into

Free Play Situation	Frustration Situation
duck. Oh, I caught a duck." Sings, takes duck home, to square 1. "Now I'll let the blood run out." Holds duck head downward. Back to square 3. "Why are there two boats?" Makes sailboat go round on lake, makes noise like a boat. "Now I put it in the boathouse. Now I go to the real boat (motorboat)." Makes boat go around the lake while making engine noises. Picks up fish pole. "I'm going fishing and boating at the same time." Fishes from boat. Constructiveness 7; 300 seconds	hole. Constructiveness 4; 50 seconds

Peg Board

(Lower Constructiveness in the Frustration Situation)

11. Child goes to peg board, contemplates it some time before beginning to place pegs. Peg in board. Looks at ring-wagon. Puts green pegs in row. "It's too cold," looks out window. "Look at all the green ones," counts them. "I have nine of them." Another in. "No more green ones." Begins with orange pegs on other side. "There are too many orange ones." Begins on purple ones. "What does it say on the paper you are writing on." Continues with purple pegs. "Look, here are the green ones, here the purple, and here the red ones, now I'll do yellow." Puts in red pegs. "There is no room for red." Begins red row parallel to orange. "I'm too hot now. There's too many reds." Constructiveness 7; 550 seconds	12. Goes to peg board. Lies out at full length on stomach, picks up peg board. "The holes go all the way through but the paper is there so you can't see them." Examines peg board, and stirs pegs in box with finger in a dilatory way. Constructiveness 3; 55 seconds

Free Play Situation	Frustration Situation
(Lower Constructiveness in the Frustration Situation)	
10. Child* goes to square 2, takes crayon, draws. Scribbles with red and yellow crayons. Makes "writing" motions with red, blue crayons; talks to self. Folds paper and hands to experimenter; evidently a "letter." Constructiveness 6; 125 seconds	6, 7, 8, 10, 11. Child* goes to square 2; sits with back to barrier. Draws with crayons. Counts colors to see if she has used them all. Pushes truck over with foot. "Look at my rainbow." Turns about, looks at barrier momentarily. Resumes drawing, taps with foot, crayon in each hand, scribbles in circles. Turns, looks at barrier. Marks on shoe, "I'm writing on my shoe." Dots on paper. Sighs. Constructiveness 4; 265 seconds

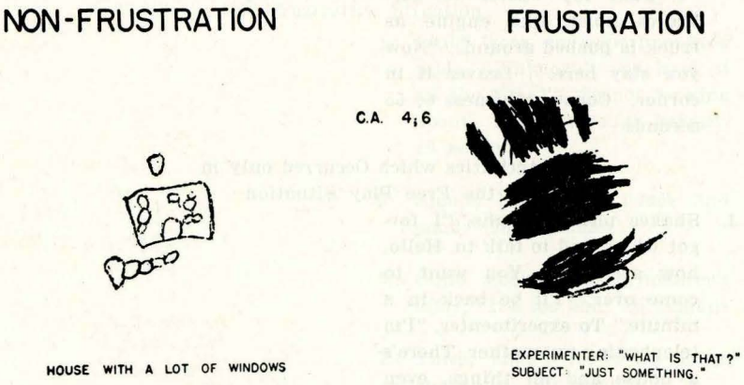


FIGURE 24a. Drawing by Subject 26, C.A. 4; 6 in the Free Play Situation and in the Frustration Situation

Doll and Teapot

(Lower Constructiveness in the Frustration Situation)

5. "I'm going to make some tea now." Takes teapot, puts doll and teddy on chair. "Pours" tea; pretends to drink; has	13. Turns and looks through barrier, "That little thing that gives the water (teapot) isn't really hot is it?" Turns to

* Figure 24a is an illustration of drawings of a child in the free play situation and the frustration situation.

Free Play Situation	Frustration Situation
teddy and doll drink. "The bear gets some more. The teddy has to get as full as the baby." Constructiveness 7; 125 seconds	square 1, picks up doll. Constructiveness 2; 15 seconds

Doll and Teddy
(Approximately Same Constructiveness in Both Situations)

2. Picks up doll and teddy, tries to sit them on truck. "The teddy doesn't sit up very well; I lay the teddy down." They both lie down. Constructiveness 5; 25 seconds	2. Places doll and teddy on truck, pushes to center. Constructiveness 6; 15 seconds
12. Looks about, goes to square 1. Doll and teddy put on truck. "I want my babies to go." Makes noise like engine as truck is pushed around. "Now you stay here." Leaves it in corner. Constructiveness 6; 55 seconds	

Activities which Occurred only in the Free Play Situation

1. Shakes phone, laughs, "I forgot which end to talk to. Hello, how are you? You want to come over. I'll be back in a minute." To experimenter, "I'm telephoning my mother. There's a house and all things, even a rolling pin." Constructiveness 6; 85 seconds

4. Examines phone. "Hello, I'm coming back and play with my clay, keep it for me." Constructiveness 6; 55 seconds

9. "I must go and telephone. Hello, how are you; I'm coming home pretty soon, will you save my clay for me?" Constructiveness 6; 30 seconds

Free Play Situation	Frustration Situation
3. Takes rolling pin. "I'm making some cookies now for the baby." Rolls with rolling pin. "They'll have them when they're made." Pretends to cut cookies. "Put, put, put." Cookies in oven. Constructiveness 7; 75 seconds	
13. Goes to ironing board, looks underneath. "How do you fold the ironing board up?" Tries. "I can't fold it up again." Tries. Ironing board won't stand up. Constructiveness 4; 125 seconds	

Activities which Occurred only in the Frustration Situation

1. Child goes to experimenter's table, "Why can't you have it all the time?" Stands looking about. Looks through barrier. 40 seconds

3. Stands looking at house and pond. 25 seconds

5. Child goes to experimenter's table, "It's too hot." 25 seconds

7. Turns about, looks at house and pond. 10 seconds

9. Turns, looks at house and pond; looks at experimenter; looks at house and pond. 30 seconds

14. Goes to barrier; stands looking through. 30 seconds

15. Comes to experimenter's table singing. Looks at the clock, "There's one too many hands on the clock. That big one's

Free Play Situation	Frustration Situation
	supposed to be little." 45 seconds
	16. Goes to barrier, "Looks like Christmas night. Why do you have to put them down?" Holds barrier looking through. 115 seconds
	17. Goes to experimenter's table almost whimpering, "I want to go to preschool." 45 seconds
	18. Looks at barrier, "Sometime will you have different things?" 15 seconds
	19. Looking at the house, "My house is that color." Moves to barrier. "Why will only part of the phone come out?" Holds on to barrier and looks through humming quietly, "Why can't you have everything in the house?" Runs finger over the wire as she talks. Kneels down by barrier looking through intently. 200 seconds
	22. Goes to table; takes experimenter's paper. "What is the matter with your pencil? Can't you screw some out?" Leans on table. "It's something like ink isn't it?" Watches experimenter intently. Makes suggestions about dotting *i*'s. Looks about room. 125 seconds

Constructiveness of Play in Consecutive Thirds of the Total Period

It is obvious from the records which have been given that the child does not maintain the same level of constructiveness throughout the experimental period. It will be shown later

that the intensity of frustration varies during the experiment. The question arises if there are consistent trends in the level of mean constructiveness throughout the experimental periods, or if the behavior is sufficiently homogeneous in this respect to be considered as a unit.

We have divided the total 24 minute experimental session into three consecutive 8 minute periods and have determined the mean constructiveness of play for each of these shorter intervals. This provides data as to the trends of the constructiveness of play throughout the whole period. The means are given in the following tabulation:

	Consecutive Experimental Intervals (8 Minutes in Length)		
	First	Second	Third
	Free Play		
Mean	4.68	5.09	5.03
$S.D._M$	0.29	0.30	0.32
	Frustration		
Mean	4.06	3.83	4.06
$S.D._M$	0.32	0.30	0.29

The differences in the average constructiveness of play in the different intervals of the experimental period are not significant in either the free play situation or the frustration situation sessions. This indicates that we are justified in considering the whole experimental period as a homogeneous unit as far as the average constructiveness of play for the total group is concerned, and that a single measure of the effect of frustration on the constructiveness of play is adequate.

Effect of Frustration on Primary Play

It has been pointed out (p. 87) that secondary play occurs relatively more frequently in the frustration situation than in the free play situation. We have already seen that its constructiveness is lower than the constructiveness of primary play (p. 118). The question arises as to what part of the decrement in the constructiveness of play in the frustration situation is attributable to the relative increase in the amount of secondary play.

When secondary play is eliminated and only the primary play activities are considered, the data shown in Table 8 result. In computing the statistics for this table, data from subjects 3 and

TABLE 8

MEAN CONSTRUCTIVENESS OF PRIMARY PLAY IN FREE PLAY AND FRUSTRATION

Subject	Free Play	Frustration	Difference (*Fru-FPl*)
Younger Subjects			
1	4.21	3.16	—1.06
2	3.36	3.84	+ .49
3	3.10		
4	4.76	4.26	— .51
5	4.34	2.41	—1.93
6	4.29	3.63	— .66
7	3.02	5.39	+2.37
8	4.01	2.30	—1.71
9	3.81	4.21	+ .40
10	4.14	4.57	+ .44
Mean (omitting Subject 3)	3.99	3.75	—0.24
Older Subjects			
11	5.14	4.94	— .20
12	5.37		
13	6.06	4.32	—1.73
14	5.01	3.78	—1.24
15	5.79	5.10	— .69
16	4.44	4.12	— .32
17	5.26	4.56	— .70
18	4.83	5.76	+ .93
19	5.36	3.48	—1.88
20	6.07	3.03	—3.04
21	4.87	5.10	+ .23
22	6.45	5.87	— .58
23	5.45	4.21	—1.24
24	6.78	3.89	—2.90
25	6.27	5.64	— .63
26	5.80	5.01	— .79
27	5.31	4.75	— .56
28	6.22	5.34	— .88
29	4.47	5.09	+ .62
30	7.57	4.12	—3.46
Mean (omitting Subject 12)	5.64	4.63	—1.00
All Subjects			
Mean (omitting Subjects 3 and 12)	5.110	4.352	—0.758
$S.D._M$	0.275	0.305	0.239

12 were omitted, inasmuch as they did not engage in primary play in the frustration situation. The mean constructiveness of primary play for the twenty-eight subjects is 5.11 in the free play situation and 4.35 in the frustration situation. The mean of the differences is 0.76 and its standard error is 0.24; i.e., the mean of the differences is 3.18 times its standard error. Twenty-one of the twenty-eight subjects show a decrease in constructiveness of primary play in the frustration situation as against seven showing an increase.

As before, the regression is greater at the older ages. For the nineteen older subjects, aged 42 to 61 months, the regression amounts to 1.00 constructiveness points, and for the nine younger subjects, the regression amounts to 0.24 constructiveness points.

The position might be taken that by excluding subjects 3 and 12 from the computations we have underestimated the effect of frustration upon creativity; the very fact that these subjects engaged in no primary play indicates that they were severely affected in this respect. However, one is hardly justified in assigning zero constructiveness to their primary play. If they are included by taking the maximal constructiveness of their secondary play as the best available estimate of their highest creativity (constructiveness 1 and 2 respectively) one obtains a mean regression in constructiveness for the whole group amounting to 0.89 constructiveness points.

We may conclude that by the usual statistical tests of significance, it is well established that primary play, i.e., play which is apparently receiving the complete attention of the subject, is pursued, on the average, upon a lower constructiveness level in a frustrating psychological environment than in a nonfrustrating situation.

In seven cases there is an increase in level of constructiveness in the frustration situation. These exceptions will be considered later.

On the basis of the previously mentioned findings that secondary play is of lower constructiveness than primary play, and that it more frequently occurs in the frustration situation than in the free play situation, it is inevitable that the reduction in constructiveness should be less when only primary play is included in the analysis than when both primary and secondary play are involved. This means that a small part of the total

regression in the constructiveness of play in frustration is due to an increase in the amount of secondary play, or, in terms of our previous interpretation of secondary play, to an increase in the frequency of overlapping regions of play and nonplay behavior. That there is more frequent overlapping of play and other regions in the frustration situation is understandable by reason of the fact that one more region of nonplay activity, i.e., barrier behavior, is present in the frustration situation than in the free play situation. On a purely chance basis, therefore, play should overlap more frequently with nonplay. It may be true, too, that barrier and escape regions are more conducive to the occurrence of overlapping with play than are other regions of free activity.

Although we may conclude that regression in the constructiveness of play in the frustration situation is partly a function of increased overlapping between play and nonplay regions which, according to our assumptions should reduce the maximal degree of constructiveness in either action, still the major portion of the regression is unaccounted for by this factor.

Maximal Constructiveness of Play in Free Play and Frustration

Additional data about the effects of frustration upon play of highest potency is to be found by comparing the maximal constructiveness of play occurring in the free play situation and the frustration situation.

In the following tabulation the mean of the two highest constructiveness ratings given each child's play are shown. In seventeen of the thirty cases this mean constructiveness rating is lower in frustration, in eight cases it is equal in the free play situation and the frustration situation, and in five cases it is higher in frustration. The mean of the differences (frustration situation minus free play situation) is −0.83 constructiveness points, and the standard error of the mean difference is 0.28, i.e., the mean difference is 2.93 times its standard error.

Although these data are in line with those previously given, they do not show the effects of frustration as decisively as did the former data. This may result partly from the lower reliability of high constructiveness ratings. In the case of some subjects the periods of maximal constructiveness involved less than one minute of play and so gave an inadequate basis for making

judgments. The reliability of the rating scale for the periods of very high constructiveness is undoubtedly lower than for the medium ranges. As the constructiveness of play increases, the behavioral basis for assigning different constructiveness ratings becomes less easily discriminable, and it becomes more and more difficult to record these fine differentiations in the records even when they are observed. In other words, the constructiveness scale does not differentiate as satisfactorily at the upper levels as at the lower. These factors may account for the less certain effect of frustration at the upper constructiveness levels.

Nevertheless these results are important, for they suggest that even with play of highest constructiveness, where the prob-

Maximal Constructiveness Ratings*

Subject	Free Play	Frustration	Difference (*Fru-FPl*)
1	5.50	4.00	−1.50
2	4.50	6.00	+1.50
3	4.50	1.00	−3.50
4	7.00	7.00	0.00
5	5.50	4.50	−1.00
6	6.50	5.50	−1.00
7	5.50	6.50	+1.00
8	5.00	2.50	−2.50
9	5.50	5.50	0.00
10	5.50	7.00	+1.50
11	6.50	6.00	−0.50
12	6.50	2.00	−4.50
13	6.50	5.50	−1.00
14	6.50	6.50	0.00
15	4.50	6.50	+2.00
16	6.50	5.00	−1.50
17	6.50	6.50	0.00
18	5.50	4.00	−1.50
19	6.50	4.50	−2.00
20	6.50	4.50	−2.00
21	8.00	5.50	−2.50
22	6.50	6.50	0.00
23	5.00	6.50	+1.50
24	7.50	5.50	−2.00
25	8.00	6.50	−1.50
26	6.50	6.50	0.00
27	6.50	3.50	−3.00
28	6.50	6.50	0.00
29	5.50	5.50	0.00
30	7.00	6.00	−1.00
Mean	6.13	5.30	−0.83
S.D.$_M$	0.17	0.27	0.28

* Maximal constructiveness is average of two highest constructiveness ratings occurring in each subject's record.

ability is smallest that overlapping regions of play and nonplay are involved, there is a tendency for constructiveness of play to be reduced under the influence of frustration. This is further evidence, therefore, that division of the person between two simultaneous actions is not the only cause of the reduction of constructiveness in the frustration situation.

Chapter VI

CONSTRUCTIVENESS OF PLAY AND STRENGTH OF FRUSTRATION

Constructiveness in Cases of Strong and Weak Frustration

The technical arrangements were planned to provide psychological frustration and free play. Inevitably, these effects were not secured in all cases, inasmuch as we only had control over the experimental situation and not over that which the child brought to the experiment. In some instances frustration occurred in the free play situation and in others there was a lack of frustration in the frustration situation. In addition all degrees of strength of frustration occurred.

Thus far in the analysis we have proceeded as if the technical arrangements had functioned as intended with all subjects. The data have been classified according to the intention of the experimenters rather than according to the realities of the situation for the subject.

We turn now to the analysis of some quantitative differences in the dynamical properties of the existing psychological situations. We propose to make use of certain measures of the strength of frustration in order to refine our data further.

Background and Immediate Situation: Overlapping within Small and Large Situational Units

That concepts and techniques are badly needed for the identification, description, and measurement of the "general" aspects of psychological situations, and that these requirements are very difficult to fulfill with any degree of adequacy at the present time, is sufficiently recognized to deserve mention in this connection only as an extenuating background for what we have done. We have been faced here with the necessity of determining the amount of frustration in the experimental situations.

When such general aspects of situations are important, one

notes a tendency to handle them in terms of nonpsychological concepts, that is, in terms of economic, social, geographic, and physical categories rather than in psychological terms. We have attempted to avoid this error and to describe and measure in psychological, behavioral terms some aspects of psychological situations which show a fluctuating character in most experiments that last more than a few seconds and give a certain amount of freedom to the child.

The task would be somewhat simpler, conceptually, if we were interested in measuring the strength of frustration during periods of action in the direction of the inaccessible goal or during periods of other behavior directly related to frustration; in other words, when the immediate situation of the child was one of frustration. Our main problem is concerned with the effect of frustration on activities which are not frustrated themselves, i.e., play with accessible toys. In this case the subject is not in an immediate situation of frustration. The frustration is merely the background, a part of the larger, more inclusive situation.

To be precise, then, we are faced with two problems: (1) to determine the strength of the frustration which is created by prohibiting the subjects from reaching the inaccessible toys; (2) to determine the extent to which this background of frustration is of importance for the play activity of the children. Obviously, these factors are not independent of each other.

The problem of how the background of a situation influences behavior in an immediate situation is a general problem of prime importance. It is particularly significant for what is frequently called the larger life situation, which plays such an important role in problems of personality and development.

Conceptually, an attempt to solve this problem touches rather basic theoretical and methodological problems. The regions of the life space which constitute the background are, according to our definition, not a part of the activity regions in which the individual is involved at the time. They are not overlapping with the immediate situation in the same way as the two situations in secondary play, for example. Frequently the subject will be so fully occupied with his immediate situation that he will not be aware of the background.

On the other hand the background still influences the behavior in some way. It cannot be omitted from the life space, if one is to be able to derive the actual behavior. The individual

behaves as if he were in an overlapping situation consisting of both the immediate and the background situation, the background usually having less relative potency.

It seems possible to clear up this conceptual difficulty by considering the implications of the concept of contemporaneity. In an empirical science the concept of a field existing at a given moment actually does not refer to a section without any duration through the flow of events. Even in physics it is impossible to describe such essential properties of a situation as the velocity of a point without treating the momentary situation as a segment which has a certain duration. Here it may suffice to say that in psychology, too, the situation existing at a given moment cannot be described without referring to a certain time depth. There seems to exist in psychology a definite relation between what one might call the size of the situation and the minimum extent of time which has to be taken into account in describing the momentary situation. To describe the momentary state of an immediate situation a shorter period can usually be taken into account than if one has to describe the momentary state of a larger situation.

These considerations open up a technical way to treat problems of background without resorting to new concepts. We merely have to realize that statements concerning overlapping situations should always be related to a situation of definite size. An individual may be involved in two overlapping activities within the immediate situation, as in secondary play. However, it is possible that the immediate situation does not have the character of an overlapping situation while at the same time the more inclusive life situation does have this character. It seems to be conceptually permissible and, as we will see, technically fruitful to treat the effect of the background upon behavior as an inclusive overlapping situation, involving the immediate situation and the background. Thus, the concept of potency can be used to characterize the relative degree of influence of the background and of the immediate situation on behavior.

It follows, furthermore, that to describe adequately a large situation at a given time one will have to refer to a considerable time depth. In other words, to describe the state of affairs at a given moment one actually has to refer to a whole sequence of events.

A simple everyday example may serve as an illustration. Consider the student who interrupts his study occasionally to listen

to the radio broadcast of the game, or vice versa, interrupts his listening to the game with an occasional bout of studying. This looks like, and it frequently feels like, an overlapping situation, i.e., a conflict between two sets of facts requiring more or less mutually exclusive behavior, in which the compromise of shifting between the alternatives occurs. With some students, of course, the simultaneous occurrence of two such sets of determiners, the one connected with the necessity of preparing for tomorrow's examination and the other with interest in the football game will lead to the attempted simultaneous actions of listening to the radio and study. One may question in such a case if actual simultaneity can occur or whether there is not rapid shifting from one activity to the other. In any case it is common experience that such a shifting of action does sometimes occur in overlapping situations.

Not all such sequences of action are thus indicative, however. A change of occupation from studying to listening to the radio, may occur when the studying is completed or the student satiated, and so indicate a change from one completely dominant situation to another.

It is therefore necessary to find a criterion for separating sequences of behavior arising in overlapping situations from those due to a succession of nonoverlapping situations. One criterion of a sequence of behavior in an overlapping situation is a certain constancy of the pattern of the sequence.[20]

We will proceed in two steps: (1) Consideration will be given first to the most inclusive situational unit occurring in our experiment; the total experimental period will be treated as one situation. We will try to determine the total amount of frustration occurring in this most inclusive situation for the various

[20] This criterion is of little value when the time interval is not sufficiently long to establish the pattern of the sequence. The only completely adequate criterion is the one which follows from the definition of a psychological situation as a region to which all the facts determining behavior are co-ordinated. According to this definition, behavior which occurs in an overlapping situation must differ from the "same" behavior when it occurs in a nonoverlapping situation. By definition, when the situation differs, the behavior must differ. Technically, however, this consideration leads to a circle. The difference in behavior cannot be used as a criterion of overlapping situations, until after the effect of overlapping situations upon behavior has been established otherwise.

children, by treating it as an overlapping situation of frustration and play. (2) After this, we will consider natural periods (episodes of behavior) within the experiment; that is, we will divide the largest situational unit into somewhat smaller units which, however, will still be larger than those we have called immediate situations (units of action).

The Measurement of Strength of Frustration in the Free Play and Frustration Situations

The problem of determining the amount of frustration becomes, in terms of these concepts, one of measuring the potency of the overlapping frustration situation. We have taken as a symptom of the potency of an overlapping region, in the case of successive rather than simultaneous actions, the relative proportion of the total time occupied by the behavior to which the situation in question is co-ordinated. In the present case, this means that we have assumed that the potency of the frustration region is indicated by the proportion of the total experimental period occupied by frustrated behavior (barrier and escape behavior). It should be mentioned again that the inaccessible toys are not the only source of frustration. Frustration arises also when the child is prevented from leaving the experimental situation even in the free play situation. However, there is some indication that much of the escape behavior in the frustration situation derives from the separation from the inaccessible toys. Whatever the source of the need to leave the room, it, in its turn, leads to frustration and must be included in the total estimate. The estimate of the potency of frustration is therefore based upon the sum of both barrier and escape behavior.

Inasmuch as we are here concerned with the *change* in potency of frustration from the free play situation to frustration situation, we have limited ourselves to a consideration of the *difference* in the amount of time occupied with frustrated actions in the two settings. The data are given in Table 9.

The ten children for whom the increment in potency of frustration from the free play situation to the frustration situation is least, i.e., those for whom the increment in duration of frustrated behavior is less than 450 seconds, are considered together as the "weak" frustration group. The twenty subjects for whom this

increment is greater are dealt with together as the "strong frustration group.

It should be realized that these are complex groupings and that the designations are somewhat misleading. They should more properly be called the small-increase-in-frustration group and the great-increase-in-frustration group. By referring to Table 9 it will be seen that some subjects included in the "weak" group actually exhibited a considerable amount of barrier and escape behavior in the frustration situation. They are included in the "weak" group because they also exhibited barrier and escape behavior in the free play situation and so showed little *increase* in potency of frustration. Likewise some of the subjects included in the strong frustration group showed only a medium amount of barrier and escape behavior in the frustraton situation due to the fact that they exhibited none in the free play situation. In spite of these considerations, however, the characterization of the "strong" and "weak" frustration groups is approximately true for the absolute amount of barrier and escape behavior. There is no overlapping between the groups in the total amount of barrier and escape behavior in the frustration situation. The greatest amount of barrier and escape behavior time in the frustration situation exhibited by a member of the "weak" group is 495 seconds (Subject 16), while the smallest amount exhibited by a member of the "strong" group is 535 seconds (Subject 9).

TABLE 9

TIME IN SECONDS OCCUPIED WITH BARRIER AND ESCAPE BEHAVIOR IN FREE PLAY AND FRUSTRATION

Subject	Free Play	Frustration	Difference (*Fru-FPl*)
1	20	295	+275*
2	20	290	+270*
3	0	960	+960
4	390	885	+495
5	0	735	+735
6	0	830	+830
7	0	185	+185*
8	130	980	+850
9	0	535	+535
10	145	440	+295*
11	35	665	+630
12	0	935	+935
13	10	660	+650
14	30	545	+515
15	110	685	+575
16	50	495	+445*
17	0	420	+420*
18	25	345	+320*
19	300	750	+450
20	10	585	+575
21	0	860	+860
22	10	590	+580
23	200	785	+585
24	0	765	+765
25	70	1040	+970
26	65	605	+540
27	65	490	+425*
28	30	645	+615
29	360	445	+ 85*
30	0	140	+140*

* Weak frustration cases

The mean chronological ages of the strong and the weak groups are 45.4 and 45.1 months respectively; their mean mental ages are 54.0 and 56.2 months respectively. In view of their similarity in these respects, it seems legitimate to compare directly the behavior of the strong and the weak frustration groups.

Frequency of Various Activities in Strong and Weak Frustration

Before discussing the effect of strong and weak frustration upon constructiveness of play it may be well to compare the effect of these strengths of frustration upon the general behavior of the children.

Play, Diversions, Barrier and Escape Behavior.—The weak and strong frustration groups have been defined by the increase in barrier plus escape behavior. This has been done in spite of the fact that barrier behavior and escape behavior can be said to be opposite in direction, one corresponding to the force ($f_{P,G}$), the other to ($f_{P,-G}$). We would like to know the relation between these two types of activities in strong and weak frustration.

From our analysis (See p. 80) it is to be expected that the strength of the tendency to leave ($f_{P,out}$) should increase with the strength of the frustration, and this in turn with the force toward the inaccessible goal ($f_{P,G}$).

$$(37) \quad |f_{P,out}| = F(|f_{P,G}|)$$

The data presented below bear out this expectation:

Behavior	Per Cent of Total Experimental Time			
	Strong		Weak	
	Free Play	Frustration	Free Play	Frustration
Barrier	1.2	44.2	1.9	22.9
Escape	3.9	10.4	3.1	3.8
otal	5.1	54.6	5.0	26.7

The group of subjects who exhibit the greater increase in time occupied with barrier behavior from free play to frustration also exhibit the greater increase in time occupied with escape behavior.

The relation between the amount of barrier behavior in the free play situation and frustration situation is about 1:40 for the strong group and 1:10 for the weak group. For escape behavior, this relation is about 1:3 in the strong and 1:1 in the weak groups. We have not computed the measures of variability for these data but they suggest that weak frustration, although increasing barrier behavior, does not increase escape behavior, or increases it very slightly. This result can be explained in the following way: The background of frustration as we have seen, has greater potency for the strong than for the weak frustration group. According to Lewin (53) the strength of a force other things being equal is a function of the potency of the related situation. The force ($f_{P,Out}$) in the direction of leaving the experimental room, is mainly an expression of the force away from frustration ($f_{P,-G}$), (or as we may write more conveniently ($f_{P,-Fru}$)) and its strength is therefore a function of the potency of frustration. It is more likely in strong than in weak frustration to over-rule other forces in the regions of play or diversion. In other words, if frustration is strong the subject may try to leave the experimental room completely; when it is weak he may merely withdraw to the play region or regions of diversion. Thus a quantitative difference in strength of force may give rise to such qualitatively different behavior as play (diversion) and escape.[21]

Activities Not Directly Related to Frustration.—By definition, the strong frustration group spends less time than the weak group with free activities. We are interested in how the two groups divide the remaining time among the various possible free activities. We have, therefore, stated the time devoted to each activity as a per cent of the total time spent in free activities. We have not computed the measures of variability, so we can only suggest the trends. The tabulation below shows the following changes from the free play situation to the frustration situation.

[21] A second slightly different explanation is the following: the force ($f_{P,-Fru}$) away from the region of frustration is greater in strong than in weak frustration ($|f_{P,-Fru}(Str)| > |f_{P,-Fru}(Wea)|$). We know from many data (Fajans, Lewin, Hull) that the strength of a force away from a negative valence decreases with the psychological distance ($|f_{P,-Fru}| = F(1/e_{P,Fru})$, where $e_{P,Fru}$ indicates the psychological distance between person and the region of frustration (Lewin (53)). One might say that an activity outside the experimental room has a greater psychological distance from the region of frustration than the activity regions of play or diversions. Therefore an equilibrium in weak frustration might be reached when the subject has entered a region of play or diversion. In strong frustration this distance would not suffice.

Group	Free Play	Frustration
Primary Play		
Strong	86.11	62.71
Weak	86.17	87.38
Play with Experimenter		
Strong	5.59	18.48
Weak	7.70	4.58
Island Behavior		
Strong	2.89	9.73
Weak	2.40	2.92
Activity at Window		
Strong	3.49	5.87
Weak	1.54	3.84
Looking and Wandering About		
Strong	1.91	3.20
Weak	2.18	1.27

The amount of primary play decreases for the strong group from 86.1 per cent to 62.7 per cent while it does not change with the weak group. In other words, the importance of play relative to the other free actions decreases in the frustration situation for the strong group and does not change for the weak group.

The time spent with the experimenter increases from 5.6 per cent to 18.5 per cent in the case of the strong group while it decreases from 7.7 per cent to 4.6 per cent for the weak group. Island behavior also increases in duration from 2.9 per cent to 9.7 per cent with the strong group while it does not change for the weak group. The time spent in activities at the window increases slightly from free play to frustration by about the same amount in both groups, and looking and wandering about, i.e., searching, does not change much from free play to frustration in either group.

These data are in accord with previous results and with the analysis made in the discussion of the amount of escape behavior. They indicate that in strong frustration the diversion activities have more the character of a refuge from frustration and of a substitute approach than play with the accessible toys. The relatively weaker force ($f_{P,-Fru}$) in the weak group only causes them to turn from the barrier to the same activities in which they engaged in the free play situation.

Primary and Secondary Play.—The mean per cent of total play time occupied with secondary play in the free play situation and the frustration situation is given for the strong and weak groups in the tabulation below. The following very tentative suggestions appear in this tabulation: (1) The weak group exhibits more secondary play in the free play situation than the strong group. (2) The increase in the amount of secondary play from free play to frustration is four times as great for the strong

Group	Per Cent	
	Free Play	Frustration
Weak	5.2	11.2
Strong	1.5	24.2

group as for the weak group. (3) The strong group exhibits more secondary play in frustration than the weak group. Owing to the small number of cases, and the large number of instances where secondary play did not occur, we base no conclusions on these data. However, they are in line with a comparison of the amount of secondary play in the free play situation and frustration situation, i. e., the greater the amount of barrier and escape behavior the greater the amount of secondary play. Secondary play, as has been pointed out, may be characterized as an overlapping situation of play and nonplay in which play is of intermediate potency. In the situation under consideration when there is overlapping between play and other regions the potency of the play and nonplay fluctuates. At times the potency of play approaches zero; at these times there is no play. At other times the potency of nonplay regions, e.g., barrier regions, approaches zero; at these times there is no barrier behavior and play is dominant. When play and nonplay are both of medium potency, play and nonplay activities occur simultaneously.

We do not know about the optimal relation between the potency of play and nonplay for the occurrence of secondary play. It appears, however, that in the free play situation this relation is more frequently realized within the weak frustration group. This means that in the free play situation the weak group is not deeply involved in play, and that outside interests continually intrude into the play behavior. On the other hand, in the frustration situation it appears that this optimal relation between the forces corresponding to play and to nonplay, exists more frequently within the strong frustration group. This must mean that the decreased interest in play and the increased valence of the obstructed toys and outside regions produce the required balance in the case of the strong group more frequently than in the case of the weak group.

Potency of Frustration and Length of Play Unit.—There are theoretical grounds for believing that the average length of play units should be shorter in frustration than in free play. In the first place, the potency of play is reduced in frustration and this means that the force to play, i.e., $f_{P,Pl}$ is on the average lower in frustration than in free play. If $f_{P,Pl}$ is weak relative to the other forces acting, the chances that other forces will be dominant are greater than if $f_{P,Pl}$ is strong. In the second place, it has already been suggested that play of low constructiveness, such as occurs in frustration, will be continued for shorter periods than play of higher constructiveness. This expectation, however, does not seem to be in line with our data. (Table 3.)

Data on the length of play unit in the strong and weak frustration groups are given in Table 10. The strong group exhibits a greater proportion of short play units in frustration than in the free play situation and also a greater proportion than the weak group in the frustration situation in line with expectations. The weak group, on the other hand, shows a greater proportion of short play units in free play than in frustration and also a

greater proportion of short play units than the strong group in the free play situation.

TABLE 10

FREQUENCY OF PLAY UNITS OF DIFFERENT LENGTHS EXPRESSED AS PER CENT OF TOTAL NUMBER OF PLAY UNITS FOR STRONG AND WEAK FRUSTRATION GROUPS

Situation	Length in Seconds								Play Units
	1 to 15	16 to 30	31 to 45	46 to 60	61 to 90	91 to 120	121 to 180	181	
Strong Group									
Free play	17.1	20.9	16.8	10.9	11.5	5.9	8.7	8.1	321
Frustration	24.2	24.8	16.1	6.8	13.0	7.4	4.3	3.1	161
Weak Group									
Free play	30.2	28.4	15.1	7.8	6.9	3.4	3.9	4.3	232
Frustration	19.2	17.2	12.1	17.2	6.9	10.3	10.3	6.9	116

Regression in Constructiveness of Play in Strong and Weak Frustration

The Total Period.—The constructiveness of play for the strong and weak frustration cases is given in Tables 11 and 12.

It is clear that there is a highly significant reduction in the constructiveness of play in the frustration situation in the strong frustration group amounting to $1.46 \pm .15$ constructiveness points for primary and secondary play, and $1.11 \pm .15$ constructiveness points for primary play. The first is equivalent to a regression of twenty-four months mental age, the latter to a regression of thirteen months mental age. With the weak group, on the other hand, there is a small and not significant reduction in constructiveness, amounting to 0.23 constructiveness points for primary and secondary play and 0.12 points for primary play. It will be noted in Table 11, which takes into account both primary and secondary play, that every child of the strong frustration group shows a decrease in average constructiveness during the frustration situation. The exceptional cases showing increase all fall in the weak frustration group. When only the primary play is considered (Table 12) five of the seven exceptional cases fall in the weak group and only two in the strong group. These results suggest that most of the excep-

TABLE 11

MEAN CONSTRUCTIVENESS OF PLAY IN FREE PLAY AND FRUSTRATION SITUATIONS FOR WEAK AND STRONG FRUSTRATION CASES; BOTH PRIMARY AND SECONDARY PLAY INCLUDED

Subject	Free Play	Frustration	Difference (*Fru-FPl*)
Weak Frustration			
1	4.21	2.56	−1.65
2	3.34	3.83	+0.49
7	3.06	4.94	+1.88
10	4.04	4.47	+0.43
16	4.34	4.30	−0.04
17	5.26	4.56	−0.70
18	4.83	5.76	+0.93
27	4.43	3.65	−0.78
29	4.47	5.06	+0.59
30	7.57	4.12	−3.45
Mean	4.56	4.33	−0.23
σ_M			0.46
t*			0.49
Strong Frustration			
3	3.08	1.00	−2.08
4	4.68	4.67	−0.01
5	4.34	2.36	−1.98
6	4.16	2.84	−1.32
8	4.01	2.50	−1.51
9	3.72	3.68	−0.04
11	5.14	4.18	−0.96
12	5.36	2.00	−3.36
13	6.06	4.32	−1.74
14	4.95	3.78	−1.17
15	5.79	4.65	−1.14
19	5.36	3.48	−1.88
20	6.07	3.03	−3.04
21	4.87	4.76	−0.11
22	6.20	5.34	−0.86
23	5.38	3.60	−1.78
24	6.79	3.79	−3.00
25	6.27	5.27	−1.00
26	5.80	4.14	−1.66
28	6.22	5.56	−0.66
Mean	5.21	3.75	−1.46
σ_M			0.21
t*			6.91

* t as calculated according to Fisher (19).

tions are due to differences in the dynamics of the situation, i.e., to differences in the potency of frustration.

Any doubt that real frustration, such as occurs with the strong group, leads to a significant reduction in constructiveness is dispelled by these data. It should be kept in mind, in this connection, that the selection of the strong and weak frustration groups was

TABLE 12

MEAN CONSTRUCTIVENESS OF PRIMARY PLAY IN FREE PLAY AND FRUSTRATION SITUATIONS FOR WEAK AND STRONG FRUSTRATION CASES

Subject	Free Play	Frustration	Difference (*Fru-FPl*)
Weak Frustration			
1	4.21	3.16	−1.05
2	3.36	3.84	+0.48
7	3.02	5.39	+2.37
10	4.14	4.57	+0.43
16	4.44	4.12	−0.32
17	5.26	4.56	−0.70
18	4.83	5.76	+0.93
27	5.31	4.75	−0.56
29	4.47	5.09	+0.62
30	7.57	4.11	−3.46
Mean	4.66	4.54	−0.12
σ_M			0.48
t*			0.25
Strong Frustration			
3	3.10		
4	4.76	4.26	−0.50
5	4.34	2.41	−1.93
6	4.29	3.63	−0.66
8	4.01	2.30	−1.71
9	3.81	4.21	+0.40
11	5.14	4.94	−0.20
12	5.37		
13	6.06	4.32	−1.74
14	5.01	3.78	−1.23
15	5.79	5.10	−0.69
19	5.36	3.48	−1.88
20	6.07	3.03	−3.04
21	4.87	5.10	+0.23
22	6.45	5.87	−0.58
23	5.45	4.21	−1.24
24	6.79	3.89	−2.90
25	6.27	5.64	−0.63
26	5.80	5.01	−0.79
28	6.22	5.34	−0.88
Mean**	5.36	4.25	−1.11
σ_M			0.22
t*			4.97

* t as calculated according to Fisher (19)

** Mean, omitting data for subjects 3 and 12

made on the basis of the time spent in barrier and escape behavior, a criterion which had no direct relation to level of constructiveness. The strength of frustration and the amount of regression are measured independently.

Play Units of Equal Length.—It has been shown that short play units are relatively more frequent in the frustration situation than in the free play situation for the strong group, while the reverse is true for the weak group. Inasmuch as short play units are, on the average, of lower constructiveness than long play units (p. 116), the question arises if the greater regression in the case of the strong group is the result solely of the increase in the number of short play units in the frustration situation, or if the strong group exhibits greater regression also when play units of the same length are compared. This analysis should carry us a step further in our efforts to find the specific way in which the constructiveness of play is reduced in the frustration situation. Increase in the

TABLE 13

DIFFERENCES IN MEAN CONSTRUCTIVENESS OF PRIMARY PLAY UNITS OF THE SAME LENGTH IN FREE PLAY AND FRUSTRATION FOR THE STRONG FRUSTRATION GROUP*

Subject	Length of Play Unit in Seconds: Range: 1 to 15	16 to 30	31 to 45	46 to 60	61 to 90	91 to 120	121 to 180	181+	Mean Difference†
	Estimated Mean Length: 10	20	35	50	75	100	150	200	
26	+4.00	−0.27	+2.00				−1.00	−1.00	−0.59
11	−1.83	+0.50	+0.67	−2.00	−1.00				−0.84
28		+1.50	+0.25			−1.50	−0.33		−0.54
21			+0.67		−0.33				−0.01
9	+2.00				−1.27			+1.00	+0.44
6		+2.00	−1.34		+1.00				+0.52
5	+2.00	−0.50	−2.40	−2.33	−2.66	0.00	−1.00		−1.23
25		+0.40					+2.00		+1.81
15		+2.00					0.00		+0.23
14	−0.08	−0.60	−1.50		−2.00				−1.53
22	+0.75	+0.47		+0.66		−1.50		+1.00	+0.26
12								−4.00	−3.13
20	−2.50	−1.34		−0.50			−1.00		−2.04
13	−3.50	−1.92	−5.50	−2.50					−2.90
24			−5.00	−2.33	−3.50	−2.00			−1.77
4	+1.25	−0.66	+0.57	−2.00		−3.00			−0.42
3					−0.50				−0.88
19		+1.33	−1.25		−0.75	−2.00			−1.13
23	+1.00	0.00	+1.00						
8	+0.50		−1.60						
Mean of the differences	+0.33	+0.21	−1.03	−1.59	−1.22	−1.67	−0.22	−0.75	−0.77‡

*Only data from subjects providing data in both free play and frustration are included.

†Weighted for length of unit; i.e., $\frac{\Sigma[(\text{Diff. in constr.}) \times (\text{Estimated mean length})]}{\Sigma \text{ Estimated mean lengths}}$

‡ $\sigma_M = 0.292$, $t = 2.63$, $P < .02$; t and P computed according to Fisher (19).

amount of secondary play has been found to be one, but not the only means by which regression occurs in frustration. The possibility that increase in the number of short play units is the source will now be explored. This was not done before, because when all subjects are considered together, short play units do not increase in frequency in frustration.

Data bearing upon this question are shown in Tables 13 and 14 where the distributions of the differences in the constructiveness of primary play in the free play situation and frustration situation are given for equivalent lengths of unit and for the same subjects. To obtain the data for these tables the constructiveness of all primary play units of each subject for the indicated length of time were averaged and the frustration situation-free play situation difference determined. The data of a subject were included, of course, only if he provided play units of the indicated length in both the free play situation and the frustration situation. The data show that (1) for short play units there is no consistent reduction in the constructiveness of play in frustration in the case of either the strong or the weak group, (2) for all play units longer than 30 seconds, however, the strong group exhibits regression in constructiveness while (3) for the weak

TABLE 14

DIFFERENCES IN MEAN CONSTRUCTIVENESS OF PRIMARY PLAY UNITS OF THE SAME LENGTH IN FREE PLAY AND FRUSTRATION FOR THE WEAK FRUSTRATION GROUP*

Subject	Length of Play Unit in Seconds: Range: 1 to 15	16 to 30	31 to 45	46 to 60	61 to 90	91 to 120	121 to 180	181+	Mean Difference†
	Estimated Mean Length: 10	20	35	50	75	100	150	200	
1		+1.00					−2.00		−1.53
2	−0.21	+0.53	+1.45	+0.16			+2.00		+1.39
7	−0.14	+2.00	+3.34	+1.50		+1.33	+4.00	+2.50	+2.59
10	−1.57		−2.90	−1.66	+2.50				+0.06
16	−0.74	−0.81	−0.67	−0.75		−1.00			−0.85
17	−0.33	−2.33	−0.66	+2.00	−2.00	−0.55	−0.25		−0.48
18				−2.00	+1.00		+1.00	0.00	+0.26
27					−1.00		−1.00		−1.00
29		+0.50			+1.50		−1.00		−0.09
30	−1.00	−2.00					−5.00	−3.00	−3.69
Mean of the differences	−0.66	−0.16	+0.11	−0.12	+0.40	−0.07	−0.28	−0.17	−0.33‡

*Only data from subjects providing data in both free play and frustration are included.

†Weighted for length of unit; i.e., $\frac{\Sigma[(\text{Diff. in constr.}) \times (\text{Estimated mean length})]}{\Sigma \text{ Estimated mean lengths}}$

‡ $\sigma_M = 0.53$, $t = 0.623$, $P = .6$; t and P computed according to Fisher (19).

group the data are not consistent. (4) When the differences for all lengths of play units are summed across these tables,[22] the mean regression amounts to 0.77 points for the strong frustration group, and 0.33 for the weak frustration group. The former mean is 2.63 times its standard error and P is between .02 and .01. The latter is 0.62 times its standard error and P is between .6 and .5.

These are the most decisive data which the analysis has thus far provided relative to the effect of frustration upon the constructiveness of primary play. They indicate that when primary play is embedded in a larger situation involving pronounced psychological frustration (strong group) it is of lower constructiveness than play which occurs in a nonfrustrating situation, even when the effects resulting from decreased length of play unit and increased secondary play are eliminated. In addition, however, a background of strong frustration leads to further regression in constructiveness by decreasing the average length of play units and increasing the amount of secondary play.

These results indicate that the amount of regression in constructiveness of play is determined by the psychological dynamics of the situation, and is not an artifact, for example, of the temporal order of the free play and frustration experiments. The weak and the strong cases were treated the same, yet those cases in which the internal evidence indicates strong frustration show a significant decrement in constructiveness equivalent to a regression of twenty-four months, they exhibit a significant regression also for play units of equal length; the weak cases, however, do not show a significant change in either case.

Constructiveness in Different Episodes: Measurement of the Potency of the Background of Frustration

General Remarks

Thus far we have taken two steps in dealing with the data: (1) We have made an analysis in terms of the experimental set-

[22] In determining the mean free play-frustration difference for each subject, each of the component differences was weighted according to the mean length of the units included, inasmuch as they contribute to the total score roughly in proportion to their mean length (See note to Table 13).

tings. The frustration situation was intended to create a psychological background of frustration for our subjects, while the free play situation was intended to provide the children with a free psychological situation. We have presented evidence to indicate that *on the average* these intentions were fulfilled. However, it was inevitable that with some subjects the intended psychological situations did not occur. (2) In order to relate the results to the actual psychological situation, we divided the subjects into two groups on the basis of objective behavior symptoms, namely, into a strong frustration group and a weak frustration group.

It is obvious to one working with the data, however, that the refinement should be carried further. Not only did the amount of frustration differ from subject to subject, but also for the same subject from period to period of the experimental session. As an example, the activities of one subject are represented graphically in Figure 25. One gains the impression from this record that the psychological situation changed near the end of the period from a rather frustrating situation (i.e., much barrier behavior) to a period of very little frustration. Such spontaneous changes in the character of psychological situations are the rule rather than the exception, (compare also Figure 16 and Figure 17). Satiation, learning, insight, and adaptation are names for processes by which the psychological characteristics of existing situations change.

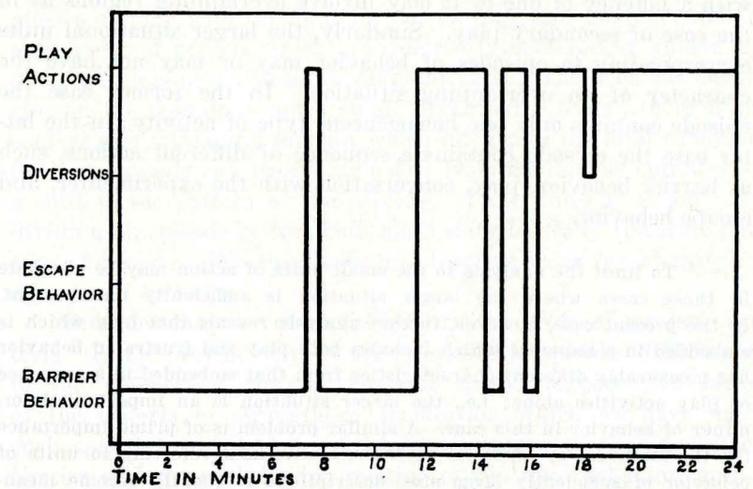


FIGURE 25. Sequence of Behavior of Subject 28 in the Frustration Situation

Because of the instability of psychological situations, it is necessary to take steps to insure that the essential characteristics of a situation will not change during an experiment, or to take into consideration the changes which do occur. Obviously the latter course is the only one possible in this type of experiment.

Techniques are therefore required for determining the nature of psychological situations as they affect particular subjects at particular moments. The technical requirements are the same as those discussed in connection with the measurement of the strength of frustration and we have handled them in the same way, i.e., in terms of overlapping regions of differing potencies (p. 139).

We have dealt first with relatively small units of action corresponding to "immediate situations." Next we have treated the total experiment as one unit and have distinguished the strong and the weak cases.[23] We turn now to units of intermediate size which we call "episodes of behavior."

The length of these episodes is not arbitrarily determined as is the duration of the experiments; they are "natural" psychological units of relatively large size in the same way that the "units of action" are natural psychological units of a smaller size. In some cases the total experiment is included in a single episode of behavior.

The immediate situation may contain a single activity region with a potency of one or it may involve overlapping regions as in the case of secondary play. Similarly, the larger situational units corresponding to episodes of behavior may or may not have the character of an overlapping situation. In the former case the episode contains only one homogeneous type of activity; in the latter case the episode contains a sequence of different actions, such as barrier behavior, play, conversation with the experimenter, and escape behavior.

[23] To limit the analysis to the small units of action may be adequate in those cases where the larger situation is sufficiently unimportant. In the present case, however, further analysis reveals that play which is embedded in a sequence which includes both play and frustrated behavior has measurably different characteristics from that embedded in a sequence of play activities alone; i.e., the larger situation is an important determiner of behavior in this case. A similar problem is of prime importance for the methodology of social psychology. Without referring to units of behavior of sufficiently large size, descriptions frequently become meaningless (See Lippitt (56)).

We assume that the potency which each of the smaller units S^1 and S^2 (each corresponding to one type of activity) has within a larger overlapping situation (corresponding to an episode of behavior) is roughly proportional to the relative amount of time $ti(B^{S1})$ and $ti(B^{S2})$ spent in each type of activity within the episode.

$$(38) \quad Po(S^1) : Po(S^2) = ti(B^{S1}) : ti(B^{S2})$$

We will use this proportion as an operational definition for potency of a region of action within a larger situation if the latter contains a sequence of behavior. At present we will pay attention only in a limited degree to the intensity of the various actions within the episode of behavior, although this factor must finally be taken into account more fully.

In our case the potency of the frustration situation (barrier and escape behavior) can be viewed also as a symptom of the average strength of frustration during an episode of behavior. To some degree we have made use of this relation in the preceding chapter. Now we intend to use it in a somewhat more refined way.

Episodes of Behavior

Episodes of behavior may be identified as follows: An episode of behavior generally contains several units of action, e.g., a sequence of play with different toys or of play and nonplay, that is a sequence of actions which are differently centered or guided by different ideas or purposes to different ends. The behavior occurring in the episode is not a single organized activity; there is no central idea or leading thought which integrates the total behavior. Such an episode can be distinguished from contiguous episodes by a shift in the pattern of the sequence of the units of action. By dividing an episode in two, both parts show basically the same pattern of actions. We thus have an objective basis for identifying episodes of behavior.

Episodes may be distinguished on the basis of various criteria. In the present case, we are interested in episodes differing as to the potency of the barrier and escape regions. In terms of the criteria of strength of frustration which we have used, such episodes are characterized by a constancy in the amount of barrier and escape behavior relative to the total behavior, and a change in episode is marked by a change in this proportion. The

identification of episodes is objective in all respects except in the specification of the exact point of termination of one episode and the beginning of another. It is necessary to assign a specific boundary point within the indeterminate boundary zone between two episodes on the basis of subjective impressions. The average error involved here is probably not great when a large number of such estimates are considered, since within the indeterminate region errors are as likely to be made in one direction as the other.[24]

For the purpose of this analysis, we constructed charts for each subject similar to those shown in Figures 16 and 25. By inspection we divided these charts into episodes of behavior at points where the relative amount of time occupied by barrier and escape behavior and diversions changed markedly. Activities with the experimenter, island behavior, activities at the window, and looking and wandering about, were included as symptoms of frustration in making this analysis because of their ambiguous nature and because results reveal a small positive relation between strength of the primary frustration (barrier and escape behavior) and the frequency of such behavior.[25] When the episodes had been identified the proportion of the total time occupied with such behavior was determined and the episodes were classified according to the potency of frustration, as measured in this way. Both the free play situation and the frustration situation data were dealt with in the same way, and the episodes were classified according to potency of frustration without regard for the experimental session in which they occurred, or for the source of the frustration, i.e., barrier or escape.

As the discussion will show, it was necessary to designate a few special episodes on the basis of the kind of activity.

In grouping the episodes into categories on the basis of potency of frustration, it appeared inexpedient to make the categories narrow or to consider the potency rating too precisely, for it is obvious

[24] Lippitt and White in a forthcoming publication and using a similar method of dividing the behavior of groups in various social atmospheres into natural episodes, found a high reliability for the placing of the boundary point.

[25] For the less refined measure of the strength of frustration during the experimental session as a whole we took into account barrier and escape behavior only. In Table 15 are given the data including and not including diversions.

that our criterion for potency of frustration is crude. We have identified the episode categories shown in Table 15 where the time occupied with barrier and escape behavior and diversions, the estimated potency of frustration on a scale from 0 to 1, and the total time spent in each episode category, are given.

Examples of Types of Episodes

These episodes may be characterized and exemplified as follows:

I. Barrier and escape behavior predominates; only secondary play occurs. Frustration is maximal. In view of the occurrence of secondary play potency of frustration ($Po(Fru)$) was rated .95 instead of 1.00 in spite of continuous barrier and escape behavior or diversions during these episodes.

TABLE 15
FREQUENCY OF OCCURRENCE AND CHARACTERISTICS OF EPISODES

Episode Category	Total Time Occupied With: Barrier and Escape Behavior and Diversions — Mean Per Cent	Barrier and Escape Behavior and Diversions — Range	Total Time Occupied With: Barrier and Escape Behavior — Mean Per Cent	Estimated Potency of Frustration	Total Time: Spent in Play — Mean Per Cent	Total Time: Seconds
I. Barrier and escape behavior dominant; only secondary play occurs	100	100	100	.95	0	9,590
II. Barrier and escape behavior and diversions dominant; some primary play occurs	72	60 to 99	50	.7	28	15,590
III. Play and frustration of about equal frequency	44	30 to 59	32	.5	46	15,250
IV. Play dominant; some barrier and escape behavior occurs	26	20 to 29	17	.3	74	10,445
V. Play dominant; practically no barrier and escape behavior occurs	5	0 to 13	1	.05	95	37,485
Va. Superficial play dominant	11	5 to 15	0	.05	89	4,550
S_1. Real substitutes	100	100	100	?*	100	1,260
S_2. Irreal substitutes	92	88 to 100	84	?*		1,510

*See page 163 for discussion of potency of frustration in these cases.

Subject 6

Barrier behavior	Child looks at barrier.
Escape behavior	"I'm ready to go to preschool now." (Voice a little playful.)
Diversion	Goes to radiator; climbs and sits with face to window.
Escape behavior	"I'm ready to go now," repeats four times in singsong way.

Diversion	Runs hand over radiator. Watches E write.
Escape behavior	"I'm ready to go now." (Exaggerated niceness.)
Barrier behavior	Goes to barrier. Takes cords off curtain.
Escape behavior	To square 3. "I'm ready to go to school now." Repeats.
Diversion	Goes to wall. Walks behind curtain at barrier. Walks around middle of room on the patterns of the floor. Goes to radiator.
Escape behavior	"I'm ready to go?" asks pleasantly. Repeats twice.
Diversions	Watches E write. Hits table, then hits herself.
Barrier behavior	Points to barrier. Makes gestures for E to put up the barrier. Walks along barrier and looks through.
Escape behavior	Goes to radiator. "I'm ready to go." E, "I haven't finished my lessons." S, "All right, when you finish then you'll have to take me back." Hits fists together, "My mamma may come. I want to go and play. I want to go home to my mamma." Hands to face and behind neck. "I'm ready to go now." Squirms. Rubs eyes, as if tired. Makes a noise.
Barrier behavior	Looks through barrier.
Diversions	Makes sucking noise. Climbs on radiator. "Oh, I see something." Laughs, looks out of the window. Turns around and sits on sill, "I won't fall off, will I?"
Escape behavior and diversions	"I'm ready to go across the street. Maybe my mamma is here. Hums. Fingers toes. Sits restlessly on window sill. Sings, "I'd like to go now." Looks out window. Gets down.
Barrier behavior	Goes to barrier, starts to climb. Looks at E. Looks through barrier. "I can climb and jump over." Looks at E, looks through barrier, makes grunting noise.
Escape behavior	To table, watches E. Picks nose. "I guess my mamma is here already." Watches E. Wrings hands. Looks at E's writing. "My mamma will come already, if you write on the back. You have some more paper, don't you?" Arms behind neck. "I want to go home." (Louder) "I want to go across now. Is that the last paper? My mamma will come." "I want to go over there and play in the sand." "Why don't you take me over and come back? Will you be done after a while?" No response by E. "We have some baby pups at our school." Hits fist on table. "My mamma." Hits middle of table hard, squirming.

II. Barrier and escape behavior and diversions are dominant, though some primary play occurred. Potency of frustration rated .7.

Subject 12

Primary play	Child goes to table. Puts sailboat together.
Escape and secondary play	Gets up, "I'll go back to preschool now, may I?" Goes to square 2. Sticks piece of clay to clay board. "I go back to preschool, may I now?" Voice very plaintive and polite. Repeats three times.
Diversions and primary play	Goes to middle of room. Walks around, picks up fish pole, goes to lock, puts fish pole against lock, goes to bolt at west wall, fish pole placed against it. To square 1; brings chair to table.
Barrier behavior	Goes back to barrier; "May I play here once more?" Pushes upper barrier hard. Manipulates hook; "Let me play here once more." (Plaintive, but polite.) Repeats. Goes to table talking.
Escape behavior	"I want my overalls on, I go back to school." Repeats twice; pushes on door.
Diversion and secondary play	To table, "What's that paper?" (Voice not plaintive.) Gets crayon from 2, marks on E's paper. E gives him another.
Escape behavior	Gets up, "I go back now." Goes to rear door, pushes; takes chair to rear door. "I'll get lock open."
Diversion	Gets down from chair. Talks, walks about middle of room.
Barrier behavior	Goes to barrier; shakes, walks along barrier, reaches through. "Please let me play." Repeats three times; goes along barrier, pulls curtain. To E, "Please let me." Repeats twice, plaintively.
Escape behavior	"I go back to school." Tries to get up on chair by the door. Gets ironing board from square 1 and tries to climb on it to open door.
Diversion	Goes to table, stands looking out window while fingering crayon.
Escape behavior	Goes to door, "May I go back to school?" Observes window, tries door. Goes to rear door, tries it, shakes it, "May I go back to school?"
Barrier behavior and secondary play	At table, takes crayon and puts it in basket, takes basket to barrier. Drops crayon through the barrier. "May I play there once more?" Pushes barrier.
Primary play	At square 1. Detaches truck and trailer, then reattaches. Gives truck big push, makes noise of truck, detaches, reattaches; truck noise; whispers to self very rapidly. Makes restless, energetic movements.
Escape behavior	"May I go back to school?" Goes to rear door. Goes to table, "I go back to school." (Plaintive voice)
Diversions	Goes to wall, tries light, touches clock cord and gets a shock; "I'll tell my mother. I need to wash it."

	Goes to table and rear door. Stands at table watching E write. "Don't write on that paper more." Goes to window, "I see a bird." (Calm voice)
Barrier behavior	Goes to barrier, looking through, "I play there more." Pushes barrier. Pulls curtain of barrier up and down, up and down. Pulls curtain clear down, then up. Goes to rear door, shakes.
Escape behavior	"I go now," (urgent and plaintive.)
Diversions	Goes to window, "I see robin," (pleasant voice).

III. Frustration and play behavior are of approximately equal potency. Potency of frustration rated .5.

Subject 11

Barrier behavior	Barrier is down. Subject standing by barrier. "I want the big truck and trailer," repeats six times; moves along barrier. Goes to table. "I want the big truck and trailer;" repeats two times. E, "No." Goes to square 1, touches truck and trailer, looks through barrier, looks at phone. Goes to barrier, "I'm going to open this; how do you? Can you open it?"
Diversions and secondary play	Goes to square 3; gets fish pole. Walks behind square 2; goes to observer's window. Pokes fish pole through keyhole; pulls it out.
Barrier behavior	Looks at barrier.
Primary play	Goes to square 1. Truck and trailer reattached. "I'll bring the truck here." Detaches truck, runs it down trailer, reattaches.
Diversions and secondary play	Walks to table, runs finger over E's paper. To square 1, picks up iron.
Escape behavior	Goes to table, "I want to go back to school." Repeats two times.
Barrier behavior	Goes to barrier, "I like to go there." Looks through barrier, pulls curtain down, runs it up half way, then clear down. Runs barrier curtain up and down.
Barrier behavior and secondary play	Goes along barrier; attaches fish pole to cord; pulls three-quarters down.
Primary play	Walks to square 2, "I'll play with the crayons." Puts crayons in box. Colors.
Diversions	Asks E, "Where is the pencil?" Repeats four times. Goes to table, then repeats three times. Fingers iron. Watches E, "Is that your pencil?" "Is that your pen?" Leans on table watching intently.
Primary play	Goes to square 2, replaces crayons, colors, makes dots, musses up crayons in box, colors with hard, vigorous

	sweeps, takes new paper. Picks up papers, takes them to table, "Over here." Clears off truck. Spreads papers out on table; colors with pink crayon. "I'll take the paper off." Unwraps crayon; colors, makes dots, makes long line like writing.
Barrier behavior	Goes to barrier. Finds bracelets in corner (left by another child), "Whose are these?" Repeats five times. "Can I put them on?" Lifts barrier curtain and looks under. "I'm going right back in there." Repeats five times.
Primary play	Goes to table, then to square 1. Takes ironing board to table, "Ironing board, ironing board," sings it fourteen times. Places cup, saucer, teapot, iron and truck on ironing board. Pours tea, yawns.
Escape behavior	"I'm going back to school," repeats four times.
Barrier behavior	Walks to barrier. Manipulates lock. "I have a key." Looks along barrier, under curtain. "I like that sweeper," (toy behind barrier) repeats five times.
Primary play	Goes to middle of room. Mutters about coming here to play as he manipulates magnet and fish pole. Threading fish pole through magnet, and sewing cord around magnet, "Look what I am doing."
Diversion	Goes to light switch, turns light off and on. "Bang!"
Barrier behavior and secondary play	Gets bracelets at barrier, puts them on. "These are my rings." Looks at barrier, as he works with bracelets.
Primary play	Throws them away. Stamps across to square 1. Sits on chair and rocks hard. Walks to middle with chair. Sits down. To table; knocks ironing board over, does not pick it up, moves to table. Tries to sit on chair in various ways. Gets crayon from floor and marks on paper. Smashes crayon down on paper. Goes to square 3 with chair, rocks. "Here's the ironing board," picks it up, places it on the chair. Iron picked up, irons paper torn from square.
Barrier behavior	Lifts barrier curtain; "I want in there, can I go in there?"
Diversions	Drops iron and carelessly walks over toys.

IV. Play dominant, but both barrier and escape behavior and diversions are also present. Potency of frustration rated .3.

Subject 28

Primary play	Walks to square 1. Talks about boat. "Why does this cabin come out? Is it meant to?" "I can have these (papers) for clothes." Takes paper to square 1. Re-

	turns to square 3. "And this much for pond." Places things from square 3 around radiator. "What kind of frog is this? Why is it green? Why do they jump?" Swings fish pole. "Frogs aren't tame, are they?" Places fish pole against bolt in wall. "This is a steam shovel. How can I play with it? (referring to fish pole). Just hold it?"
Barrier behavior	Goes to square 1, then to barrier. "When can I get in there? Why can't I? Can I attach this rope here?" Repeats four times. Ties cord to barrier. "Make an elevator of it?" Talks about elevator. Looks through barrier.
Diversion	Walks to radiator, talking about elevators and explaining how they work. (Pleasant voice)
Barrier behavior	Looks through barrier.
Primary play	Talks more about elevators. Goes to square 1. Places square of paper on ironing board. "I have lots of ironing to do, don't I? Look!" Sits on chair.
Barrier behavior	Looks through barrier.
Primary play	"Here will be the ironing place." Facing barrier, irons. "Trrrr." Answers phone. "Hello! No, he's just busy now. When he's through he can answer. They asked if you would go to Davenport. They had a big truck and trailer to take your dishes in. They said the truck and trailer were new." Begins ironing again. "Oh, this is awful hot." Brings to E to test. Returns. Irons. Gets up with paper. "I'll use this for the floor, too. It will be a great big floor. Now, I need something for a store." Walks about at intervals.
Barrier behavior	Goes to barrier, "You should have let me play a little longer. Say, it might sprinkle in here. I'd better get the cardboard house." Repeats twice. "Then I'd have to get in the play house. Say, is there any chimney, etc., etc.?" Walks to square 1. Sits on chair.

V. Play and diversions, but no escape behavior present. Potency of frustration .05, in view of the fact that the situation was, after all, not entirely without restriction. An example of this type of episode is given on p. 296.

Va. Superficial interest shown in play: This is the first of the special categories. In it are included episodes in which all requirements for inclusion in category V were met, but in which the interest in play or the "intensity" of play appeared too abnormally low. These are typical cases of superficial interest. Such children sat beside a group of the toys and handled or played with them

in a lethargic way. Extraneous occurrences easily distracted them from their play. However, they engaged in no escape behavior.

Apparently these are cases where potency of frustration was low and potency of play high, but where the force toward play, $f_{P,Pl}$ was weak. The interest in play was not usurped by activity of higher potency, but the tension involved was very low and superficial. These cases are discussed in more detail later (p. 185).

The characterization of this episode is based upon a subjective estimate of the strength of the tension corresponding to the need for play. The problem is not sufficiently important in this connection to warrant a detailed consideration of the justification.

We have not based any major conclusions upon this category. For all crucial comparisons these episodes have been included with category V.

Subject 21

Superficial primary play	Takes crayon, walks to square 2. Moves fingers on top of the box, then opens it. Takes crayon box in lap. Examines holes of box, takes lid off, takes crayon in hand. "Isn't that a pink color?" (Orange) "What color?" Makes a light line on paper. Colors knees, scratches leg with crayon. "I have two sores on that knee, and one on that." Marks on paper, head resting on her knee. Marks on sock.

See also example on page 292.

S_1, Real substitutes: In this special category have been placed episodes in which play with the available toys is either a substitute for, or a means of approach, to the inaccessible toys. An example of the former is "fishing" through the barrier with the available fishing pole, pretending to catch the obstructed toys. An example of the use of the available toys as an approach is found in the hauling of the toys to the barrier, putting them through, and asking the experimenter to raise the barrier in order that they may be recovered. In these cases, frustrated actions and play are functionally identical.

This category is also a subjectively determined classification. One has to interpret the meaning of the play before an episode can be placed in this group. For this reason no decisive conclusions have been drawn from this analysis. For all important comparisons, S_1 and S_2 have been combined with category V. The strength of frustration in these cases is difficult to judge. In those instances

where an adequate substitute is attained, no frustration occurs; if, on the other hand, the activity has no substitute value, frustration may be maximal.

Subject 22

Barrier behavior	Subject goes to barrier near the lake and tries to raise the barrier unsuccessfully. She stands awhile.
Substitute fishing through barrier	She looks through and says, "I'll pretend this is the water." She sticks the fish pole through. "Look, I caught a fish!" She laughs. "I'll take it off and put it on the boat." Fishes through the barrier again. She says, "I'll take it off and put it on the boat." Fishes through barrier again. She says, "I'll go back and get some real water and fish."
Barrier behavior	Speaks about fish on other side and starts to lift the barrier, but can't do it. She laughs, and is a little embarrassed. "And that big truck and trailer and everything."
Primary play	She turns to square 1, "I guess I'll iron. I wish you had some clothes here." She sits down and irons.
Barrier behavior	"Go over and get some clothes. Go over and get some clothes for me. I am tired. Why can't those things be over here? I want the balloon."
Substitute ironing of dress	Child continues her ironing. "I'll just iron my own dress." Puts own skirt on ironing board and irons. "Now, doesn't that look pretty?"

S_2, Irreal substitute: This is a small category involving about 1 per cent of the total time. In it have been placed episodes in which conversation about the toys occurs. This did not have the character of a social attempt to get the toys.

Subject 24

Irreal substitute	Walks to barrier, touches wire. "It looks like Christmas night. Why do you have to put it down? My house is that color. Why will only part of the phone come out, I can't see?" Moves along barrier. "Why can't you have everything in the house?"

Constructiveness of Play in Episodes Differing as to the Potency of Frustration

If the potency of the background of frustration can be adequately measured in the way which we have indicated, and if constructiveness in play decreases with the potency of frustration (as suggested by the results for the strong and weak frustration cases)

one can expect a relation between constructiveness of play and the kind of episode in which the play occurred. The constructiveness of play in an episode should vary inversely with the potency of frustration in that episode.

Average Constructiveness and Potency of Episode.—In Table 16 the mean constructiveness of play in the various episode categories is shown. Both primary and secondary play and play units of all lengths are included. These results show in a very striking way the increase in the constructiveness of play as the potency of frustration decreases. It will be noticed that the magnitudes of these differences greatly exceed those obtained when constructiveness in the free play and frustration situations are compared. The difference between the mean constructiveness of play in categories I and V is 3.82 points. This enhanced differentiation may be attributed to the greater exactness with which psychological situations are isolated in the present analysis. These results are shown graphically in Figure 26 where the relation between potency of background of frustration and constructiveness of play is given.

TABLE 16

MEAN CONSTRUCTIVENESS OF PLAY (PRIMARY AND SECONDARY) IN EPISODE CATEGORIES DIFFERING AS TO RELATIVE POTENCY OF FRUSTRATION AND PLAY

Episode Category	Number of Episodes	Estimated Potency of Play	Estimated Potency of Frustration	Mean Constructiveness
I	8	.05	.95	1.81
II	29	.30	.70	3.31
III	18	.50	.50	4.19
IV	16	.70	.30	4.43
V	31	.95	.05	5.63
Va	5	.95	.05	4.50
S_1	5	?	?	6.00
S_2	2	?	?	3.25
V, Va, S_1	41	.95	.05	5.44

Constructiveness of Play Units of Different Length and the Potency of the Background of Frustration.—The effect of the potency of frustration upon constructiveness could result from an increase in the number of play units of short duration in the episodes of high potency of frustration. In fact it is inevitable, on the basis of the criteria used for determining potency of frustration, that

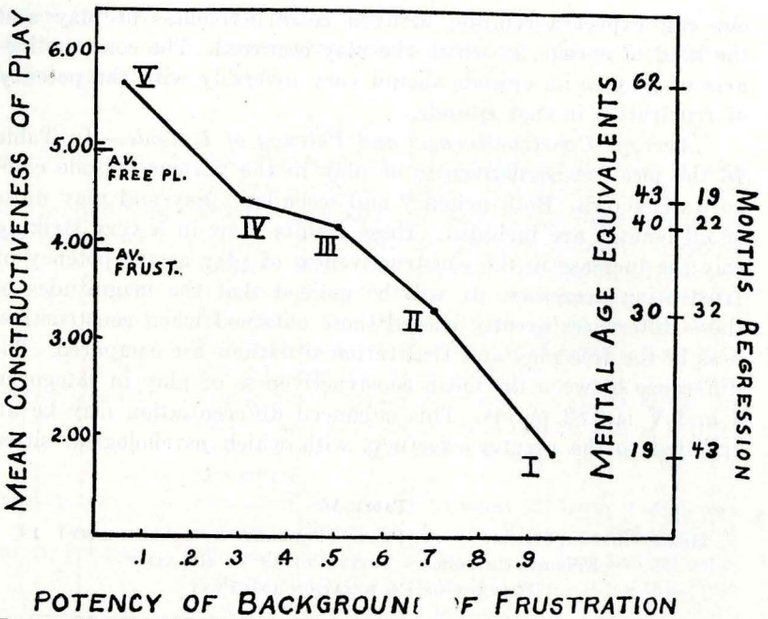


FIGURE 26. Relation between potency of frustration and the amount of regression

The constructiveness of play (scale at left ordinate) for the Episodes I to V is expressed in mental-age equivalents on the right ordinate. (The values are computed from the relation between mental age and constructiveness in the free play situation, p. 114. For the extrapolation to the younger ages necessary here a logarithmic relation has been assumed, $y = 7.48 \log x - 7.81$.) The amount of regression is the difference (in months) between the level of constructiveness in fully involved play, Episode V, and that in the other Episodes.

the strong frustration, i.e., low numbered categories should have fewer long play units than the weak frustration categories and hence, because of the positive relation between length of play unit and constructiveness of play, that the average constructiveness of all play should be lower in such categories. We have discussed a similar question when comparing the mean constructiveness in the frustration situation and free play situation. We now ask again whether different potencies of the background of frustration have any effect upon the constructiveness of play units of the same length.

In Table 17 and Figure 27 the length of the play unit is controlled. For play units of the same length, the constructiveness of play seems to vary inversely to the estimated potency of frustration. There are some inversions, doubtless due in some instances

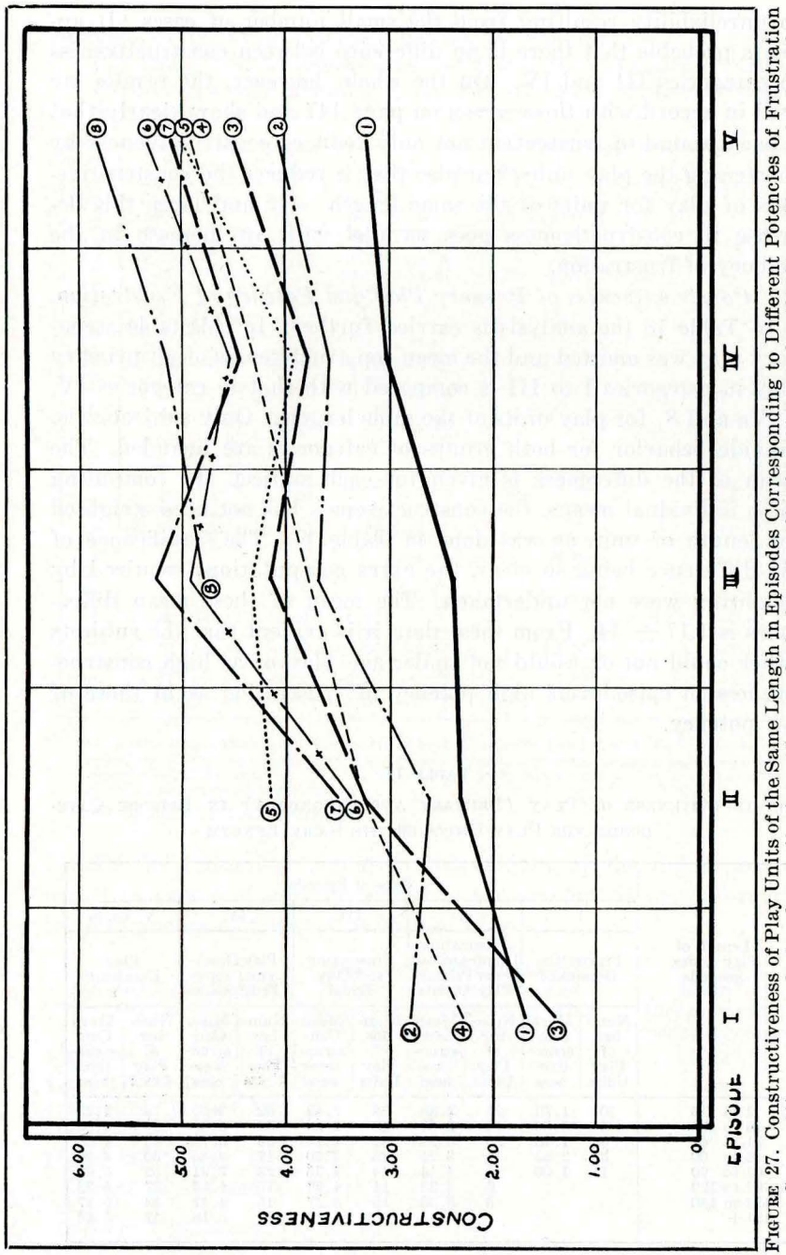


FIGURE 27. Constructiveness of Play Units of the Same Length in Episodes Corresponding to Different Potencies of Frustration
Curve (1) corresponds to play units 1 to 15 seconds in length, (2) 16 to 30 seconds, (3) 31 to 45 seconds, (4) 46 to 60 seconds, (5) 61 to 90 seconds, (6) 91 to 120 seconds, (7) 121 to 180 seconds, (8) 181 or more seconds.
Episode I corresponds to the highest potency of the background of frustration, Episode V to the lowest potency.

to unreliability resulting from the small number of cases. It appears probable that there is no difference between constructiveness in categories III and IV. On the whole, however, the results are well in accord with those given on page 147 and show clearly that a background of frustration not only reduces constructiveness by shortening the play units, but also that it reduces the constructiveness of play for units of the same length. By and large this decrease in constructiveness goes parallel with an increase in the potency of frustration.

Constructiveness of Primary Play and Potency of Frustration. —In Table 18 the analysis is carried further. In this table secondary play was omitted and the mean constructiveness of all primary play in categories I to III is compared with that in categories IV, V, Va and S_1 for play units of the same lengths. Only subjects who provide behavior for both groups of categories are included. The mean of the differences is given for each subject. In computing these individual means, the constructiveness has not been weighted for length of unit, as was done in Table 17. The significance of the difference being so clear, the extra computations required by weighting were not undertaken. The mean of these mean differences is $1.17 \pm .14$. From these data it is evident that the subjects either could not or would not undertake play of as high constructiveness in episodes of high potency of frustration as in those of low potency.

TABLE 17

CONSTRUCTIVENESS OF PLAY (PRIMARY AND SECONDARY) IN EPISODE CATEGORIES FOR PLAY UNITS OF THE SAME LENGTH

Length of Play Units, Seconds	Type of Episode									
	I		II		III		IV		V, Va, S_1	
	Frustration Dominant		Frustration Dominant but Some Primary Play Occurs		Frustration and Play Equal		Play Dominant; Some Frustration		Play Dominant	
	Number of Play Units	Mean Constructiveness	Number of Play Units	Mean Constructiveness	Number of Play Units	Mean Constructiveness	Number of Play Units	Mean Constructiveness	Number of Play Units	Mean Constructiveness
1 to 15	10	1.70	27	2.35	38	2.42	62	3.05	73	3.23
16 to 30	6	2.83	43	2.63	48	3.69	65	3.60	100	4.06
31 to 45	5	1.40	25	3.25	34	4.18	36	3.78	66	4.50
46 to 60	3	2.33	14	3.25	25	3.80	17	4.35	39	4.90
61 to 90	1	1.00	15	4.14	14	4.36	23	3.91	52	5.00
91 to 120			6	3.33	14	4.93	17	4.53	27	5.33
121 to 180			6	3.50	15	5.27	15	4.47	33	5.12
181+					5	4.80	11	5.18	42	5.86

TABLE 18

DIFFERENCES IN MEAN CONSTRUCTIVENESS OF PRIMARY PLAY IN EPISODE CATEGORIES I TO III AND EPISODE CATEGORIES IV, V, Va AND S_1* (MEAN CONSTRUCTIVENESS EPISODES I, II, AND III—MEAN CONSTRUCTIVENESS EPISODES IV, V, Va, S_1)

Subject	Length of Play Unit in Seconds							Mean**
	1 to 15	16 to 30	31 to 45	46 to 60	61 to 90	91 to 120	121 to 180	181+	
19		0	−2.92	−3.00	+1.50				−1.47
13	−4.00	−1.87	−3.33	−4.50	−3.00		−0.50		−2.87
17	+1.67	−2.33	−1.17	+2.00	−2.67	−0.20	+0.75		−0.28
12		−1.57		−3.00					−2.28
22	−2.67	+1.17		+0.75		−1.50			−0.50
15	−4.21	−3.57					0		−2.59
20	−1.00	0		0					−0.33
14	−0.44	+0.29	−1.40						−0.53
11	−2.46	+0.50	+0.67	−2.00	−1.00				−0.86
18				−3.00		−1.50			−2.25
16	−0.97	+0.22	+0.75	−0	+3.00				+0.60
26		−0.50			0				−0.25
21		−2.00	+0.50		−0.25				−0.58
6		−2.33			−1.83				−2.08
3		−3.00							−3.00
28		−0.67							−0.67
1		−1.29	−1.00	−1.00			−1.33		−1.15
8	−0.88	0	+0.80						−0.03
24	−4.00	−3.00		−1.20					−2.73
10	−1.50	+0.64	−0.08	−1.60	+1.67				+0.17
9	−1.33	−1.00	−2.33	−1.67					−1.58
29					+1.50		−1.00		+0.25
23		−1.15	+1.00				−1.00		−0.38
30					−3.00				−3.00
4								−2.00	−0.60
2	−0.36	+0.11	−0.91	+0.17					−0.86
25			+0.67	−0.50	−2.75				+1.34
7	+0.33	+0.30	+1.67	+1.50	−2.75		+4.67		−1.83
27	−1.00		−2.67						−1.23
5	+2.00	−1.71	−2.07	−2.00	−2.25		1.33		−1.17 ± .14
Mean	−1.30	−0.95	−0.69	−1.12	−0.84	−1.07	+0.03	−2.00	

*Only data from subjects providing data in both Categories I to III and IV, V, Va, and S_1 included. In the case of category I no preliminary play occurred. In accordance with the considerations discussed on page 157 we have taken secondary play as the best indicator of constructiveness in this category.

**Not weighted for time. See, p. 105

In the following tabulation the amount of the difference in constructiveness of play is related to the amount of the difference in the potency of frustration and of play:

Episode Categories Compared	Estimated Decrement in Potency of Frustration and Increment in Potency of Play on Scale of 0 to 1	Mean Increment in Constructiveness
I and V*	.90	2.32
I and IV; II and V	.65	1.38
I and III; II and IV; III and V	.45	0.83
I and II; II and III; III and IV; IV and V	.2	0.28

* Category V includes V, Va, and S_1.

In this tabulation comparisons were made only between data of the same subject for the same length of play unit. Here we find that the amount of the difference in constructiveness varies directly with the amount of the difference in the relative potency of frustration and play.

Discussion

The data of this section are important because they verify the results of the previous analyses; in fact, the magnitude of the differentiations is enhanced by the more exact fractionation of the data. Also of importance is the fact that they constitute a verification of the methods used in identifying the more inclusive psychological situations and the concepts used in dealing with them.

It should be kept in mind that the "objective" physical-geographical and social aspects of the experimentally arranged situation were relatively constant and did not enter this analysis. The psychological nature of each situation-at-large was determined solely on the basis of certain aspects of the pattern of the changing behavior, i.e., the frequency of barrier and escape behavior and diversions. These empirical facts, these patterns, were co-ordinated to the construct of overlapping regions of the situation-at-large. The finding that constructiveness of play (an aspect of behavior entirely excluded in identifying the situations) varies in accordance with the characteristics of the psychological situation-at-large in which it occurs, establishes the psychological reality, i.e., the effectiveness, of these larger aspects of the psychological situation. This does not, of course, verify in every respect the adequacy of the constructs, or the explanations which have been proposed. It does, however, indicate the necessity for these or similar concepts and explanations.

This type of analysis is, to our minds, a step in the direction which psychological methodology should take, particularly when dealing with larger situational units. Large, inclusive situations, which contain not only the immediate action but also more or less of the background of the life space are of prime importance in the field of motivation, personality, and development. The methods used demonstrate the possibility of using behavior as a basis for inferring the nature of the psychological situation, with the help of operational definitions and conceptual constructs, without resorting to a circular argumentation.

One difficulty in dealing with the influences of the situation-at-large upon behavior is the need for proving the existence of such situations in the absence of stable, invariant aspects of the physical-geographical and social environments to serve as identifications. The requisite procedures have appeared hopelessly subjective and speculative. However, by the use of empirical constructs, which though hypothetical in the beginning, can be verified by explaining other, independent aspects of behavior in terms of the same constructs, one can avoid these evils of speculation. In the present case the hypothetical step, i. e., the co-ordination of the construct of potency of overlapping situations to the pattern of frequency of activities, has been verified to an important degree by the finding that another, independent aspect of behavior, constructiveness, varies with changes in potency in the situation-at-large. How the effect of frustration on the constructiveness of play can be accounted for in terms of these constructs will be discussed later.

Effect of Frustration Upon Play with Various Toys

In this section we turn to a consideration of the influence of frustration upon play with individual toys. This approach bears directly upon the problem of what processes determine the effectiveness of frustration.

Originally the toys were chosen so that the play material on two squares had some similarity or functional relation to the inaccessible toys. Toys for playing house were placed on square 1 and water toys were placed on square 3. Square 2 contained material which was not related directly to the inaccessible toys, namely crayons or clay. It was our expectation that frustration would affect the play with these groups of toys in different degrees, but this did not occur, at least not to any considerable extent. We therefore have not treated these groups of toys differently.

Attractiveness of Toys in Free Play and Frustration

One can ask whether the decrease in constructiveness indicates a change in the valence of play activities in the frustration situation or a change in the momentary ability of the child. Play of relatively low constructiveness may be more attractive in the frustration situation than in the free play situation instead of being due to the child's inability to engage in highly constructive play.

Related to this question are data on changes in toy preferences from the free play situation to frustration situation. In Table 19 the relative proportions of the total play time occupied with particular toys in the free play situation and frustration situation are given. In the discussion which follows we will refer, unless specifically stated otherwise, to the

data for the strong frustration group, inasmuch as these data are most pertinent.

In the first place great differences exist in the desirability of different toys: the crayons, clay, and truck were each used more than 16 per cent of the total play time in the free play situation while saucer, teapot, and cup were used less than 3 per cent of the total play time.

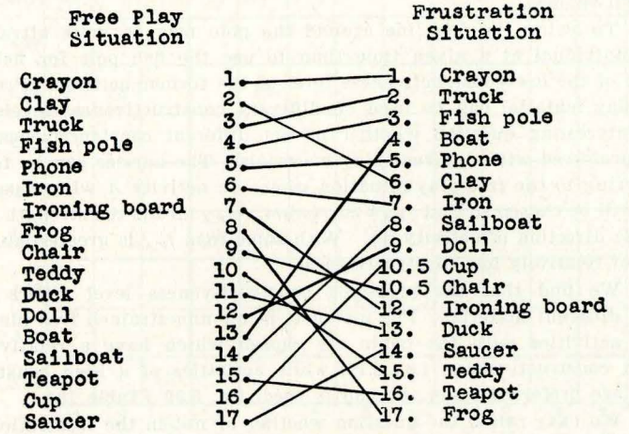
In the second place, it is clear that there are *changes* in the relative desirability of particular toys from the free play situation to the frustration situation. Below we have listed the toys in the *rank order* of their desirability (time spent with each toy) on the two occasions as indicated by the data of Table 19:

TABLE 19

CONSTRUCTIVENESS OF PLAY, AND PROPORTION OF TOTAL PLAY TIME OCCUPIED WITH INDIVIDUAL TOYS*

Toy	Constructiveness						Proportion of Total Play Time					
	Free Play		Frustration		Difference (*Fru* − *FPl*)		Free Play		Frustration		Difference (*Fru* − *FPl*)	Change†
	Rank Order	Mean	Rank Order	Mean	Rank Order	Mean	Rank Order	Mean	Rank Order	Mean	Mean	Rank Order / Per Cent
Strong Frustration Group												
Frog	11	4.70	15	2.94	1	−1.76	8	.060	17	.018	−.042	1 / 70
Duck	10	4.82	14	3.21	2	−1.61	11	.037	13	.027	−.010	6 / 27
Sailboat	6.5	5.15	12	3.56	3	−1.59	14	.031	8	.040	+.009	13 / − 29
Cup	2	5.39	10	3.89	4	−1.50	16	.025	10.5	.038	+.013	15 / − 52
Boat	8	5.10	11	3.61	5	−1.49	13	.035	4	.114	+.079	17 / −226
Phone	16	3.98	17	2.89	6	−1.09	5	.094	5	.112	+.018	12 / − 19
Doll	6.5	5.15	8	4.08	7	−1.07	12	.036	9	.039	+.003	11 / − 8
Fish pole	13	4.56	13	3.55	8	−1.01	4	.103	3	.138	+.035	14 / − 34
Teddy	12	4.69	9	3.95	9	−0.74	10	.044	15	.022	−.022	4 / 50
Truck	3	5.31	5	4.58	10	−0.73	3	.163	2	.150	−.013	9 / 8
Clay	1	5.40	4	4.70	11	−0.70	2	.181	6	.063	−.118	2 / 65
Ironing board	4	5.19	3	4.71	12	−0.48	7	.081	12	.030	−.051	3 / 63
Chair	17	3.19	16	2.93	13	−0.26	9	.049	10.5	.038	−.011	8 / 22
Crayon	5	5.17	1	4.94	14	−0.23	1	.187	1	.201	+.014	10 / − 7
Teapot	9	4.91	2	4.78	15	−0.13	15	.026	16	.020	−.006	7 / 23
Iron	14	4.17	6	4.27	16	+0.10	6	.082	7	.059	−.023	5 / 28
Saucer	15	4.01	7	4.11	17	+0.10	17	.013	14	.026	+.013	16 / −100
Weak Frustration Cases												
Frog	13	3.37	13	3.50	10	+0.13	9	.056	4	.114	+.058	15 / −104
Duck	15.5	3.13	8.5	4.03	14	+0.90	12	.042	3	.116	+.074	17 / −176
Sailboat	6	4.34	12	3.53	3	−0.81	17	.023	15	.026	+.003	10 / − 13
Cup	2	5.16	7	4.48	4	−0.68	3	.129	16	.024	−.105	1 / 81
Boat	10	3.89	14	3.41	5	−0.47	11	.043	9.5	.054	+.011	11 / − 26
Phone	14	3.20	17	2.22	2	−0.98	5	.088	9.5	.054	−.034	7 / 39
Doll	15.5	3.13	8.5	4.03	16	+0.90	15	.034	8	.065	+.031	14 / − 91
Fish pole	12	3.42	15	3.27	7	−0.15	6	.083	2	.138	+.055	13 / − 66
Teddy	9	3.90	10.5	4.00	8	+0.10	8	.063	12	.035	−.028	4.5 / 44
Truck	5	4.50	4	4.61	9	+0.11	2	.150	6	.085	−.067	4.5 / 44
Clay	1	6.25	10.5	4.00	1	−2.25	4	.101	5	.104	+.003	9 / − 3
Ironing board	11	3.79	6	4.52	15	+0.73	7	.068	14	.027	−.041	3 / 60
Chair	17	2.73	16	2.31	6	−0.42	10	.055	13	.033	−.022	6 / 40
Crayon	3	4.64	2	5.07	13	+0.43	1	.199	1	.182	−.017	8 / 8
Teapot	4	4.53	3	4.76	11	+0.23	13	.039	7	.083	+.044	16 / −113
Iron	7	4.24	5	4.57	12	+0.33	14	.036	11	.048	+.012	12 / − 33
Saucer	8	4.11	1	5.33	17	+1.22	16	.025	17	.009	−.016	2 / 64

*The proportions sum up to more than 100 because more than one toy were frequently used simultaneously.
†Proportion of total time in frustration expressed as per cent of proportion of total time in free play.



Toys for which the desirability increases in the frustration situation and the amount of the increase in terms of rank order change, are boat, 13 to 4; sailboat, 14 to 8; cup, 16 to 10.5; doll, 12 to 9; saucer, 17 to 14; fish pole, 4 to 3; truck, 3 to 2. Toys whose desirability decreases in the frustration situation and the number of rank orders of change, are frog, 8 to 17; teddy, 10 to 15; ironing board, 7 to 12; clay, 2 to 6; duck, 11 to 13; chair, 9 to 10.5; teapot, 15 to 16.

These changes in rank order are verified by the *changes* in the *amount of time* occupied with particular toys in the frustration situation. These data are given in the last three columns of Table 19. In the last column the difference in time (frustration situation-free play situation) is expressed as a per cent of the time spent with the toy in the free play situation. The toys which are used less in the frustration situation than in the free play situation, and the percentage decrease from free play situation are frog, 70 per cent; clay, 65 per cent; ironing board, 63 per cent; teddy, 50 per cent; iron, 28 per cent; duck, 27 per cent; teapot, 23 per cent; chair, 22 per cent; truck, 8 per cent. In addition to some changes in the rank order of amount of decrement this analysis differs from that above by adding iron and truck to toys whose desirability decreased in the frustration situation. In these two cases the changes are small; in general the analyses are in accord. The toys which are used more in the frustration situation than in the free play situation and the percentage increase from free play situation are: boat, 226 per cent; saucer, 100 per cent; cup, 52 per cent; fish pole, 34 per cent; sailboat, 29 per cent; phone, 14 per cent; doll, 8 per cent; crayon, 7 per cent. Except for changes of ranking and the shifting of doubtful cases, these data are in accord with those based on differences in rank order.

In the quest for an explanation of these changes in preference, we have first investigated the possibility that in the frustration situation toys are preferred for which activities of relatively low constructiveness have a high valence.

To swing the fish line around the pole may be more attractive to an individual at a given time than to use the fish pole for fishing, in spite of the low constructiveness level of the former activity. Practically all play material can be used on different constructiveness levels. It is an interesting question whether or not different constructiveness levels are preferred with different play materials. The answer can be found by referring to the free play situation where an activity A with a particular toy will be chosen so that $f_{P,A}=maximum$. ($f_{P,A}$ means the strength of force in the direction of activity A). With some toys $f_{P,A}$ is greatest for activities of relatively low constructiveness.

We find that the preferred constructiveness level differs greatly with different material. For instance, in an unrestrained free play situation activities with the chair are chosen which have a relatively low mean constructiveness, i.e., 3.19, while activities of a high constructiveness are preferred when the cup is used, i.e., 5.39 (Table 19).

We have raised the question whether or not in the frustration situation such toys as the chair, with a preferred low constructiveness level, are relatively more frequently preferred to those such as the cup with a preferred high constructiveness level. In other words, is the regression in constructiveness in the frustration situation due to the choice of toys of low "natural" constructiveness level?

In order to answer this question we have determined the change in preference from the free play situation to the frustration situation of toys differing in preferred constructiveness level in the free play situation. These data are presented in Figure 28. For each toy the amount of change in time of use is related to its mean constructiveness in the free play situation in a scatter diagram. From this diagram it appears that toys of high constructiveness in the free play situation do not suffer greater decrease of use in the frustration situation than toys of low constructiveness.

We are forced to the conclusion, therefore, that frustration does not operate by decreasing the attractiveness of toys of naturally high constructiveness, and by increasing the attractiveness of toys of naturally low constructiveness, but must operate by changing the constructiveness of the play with the same toys.

When we turn to a consideration of the toys which change in popularity to the greatest extent from the free play situation to the frustration situation in the hope of gaining some insight into the factors involved, the picture is not greatly clarified. Boat, saucer, cup, sailboat, and fish pole increase in attractiveness from the free play situation to the frustration situation by 25 per cent or more, while clay, ironing board, frog, duck, teddy, and iron decrease in attractiveness similarly. In the first group are three pond toys (boat, sailboat, fish pole) which one might expect to have a high degree of incompleteness in a situation where a real pond was not accessible. In the second group of toys of decreasing attractiveness are two pond toys, frog and duck. It is possible, though not impressively so, that these toys are more complete in themselves than the three other pond toys, boat, sailboat, and fish pole, which are preferable in the frustration situation. In addition, there are in this group four toys, clay, ironing board, teddy, and iron, which apparently have no strong connection with the obstructed toys.

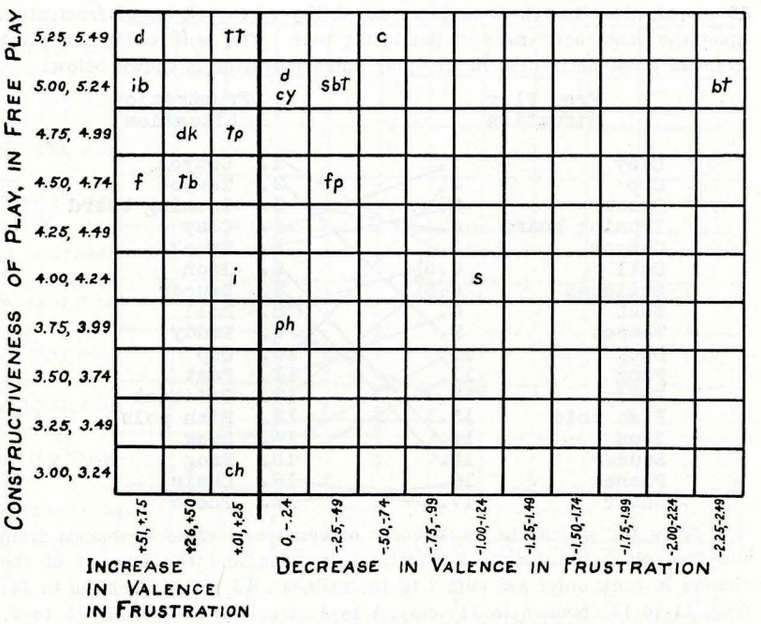


FIGURE 28. The Relation between the Mean Constructiveness of Play with Various Toys in the Free Play Situation and the Change in Valence from the Free Play to the Frustration Situation

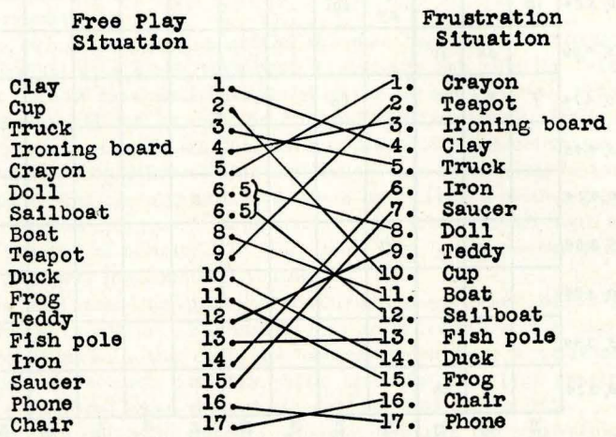
The chart indicates that the degree of constructiveness in frustration is due to a lower level of play with the same toys rather than the avoidance of certain toys. The duration of play with a toy is taken as a symptom for its valence.

The toys are represented as follows: boat, *bt*; chair, *ch*; clay, *cl*; crayon, *cy*; cup, *c*; doll, *d*; duck, *dk*; fishing pole, *fp*; frog, *f*; ironing board, *ib*; sailboat, *sbt*; teapot, *tp*; teddy bear, *tb*; telephone, *ph*; truck and trailer, *tt*.

The Degree to Which the Constructiveness of Play with Various Toys is Affected

We have already mentioned the great variability in the mean constructiveness of play with particular toys in free play. The data of Table

19 reveal, also, that there is great variability in the effects of frustration upon the constructiveness of particular toys. The rank order according to mean constructiveness in free play and frustration is shown below:



Toys for which the rank order of constructiveness decreases from the free play situation to frustration situation and the amount of the change in rank order are cup, 2 to 10; sailboat, 6.5 to 12; duck, 10 to 14; frog, 11 to 15; boat, 8 to 11; clay, 1 to 4; truck, 3 to 5; doll, 6.5 to 8; phone, 16 to 17. Toys for which the rank order of constructiveness increases from the free play situation to frustration situation are saucer, 15 to 7; iron, 14 to 6; teapot, 9 to 2; crayon, 5 to 1; teddy, 12 to 9; ironing board, 4 to 3; chair, 17 to 16.

As is to be expected, there is a reduction in the mean constructiveness of play with most toys from the free play situation to the frustration situation. The toys are listed in order of the absolute amount of regression in Table 19. Those toys for which the regression amounts to one constructiveness point or more are frog, duck, sailboat, cup, boat, phone, doll, fish pole. In two cases, i.e., iron and saucer, the mean constructiveness increases slightly, and for the following, decrease in constructiveness is ¼ constructiveness point or less: teapot, crayon, and chair. The remaining toys, teddy, truck, clay, and ironing board show an intermediate decrease of constructiveness in frustration.

In the attempt to find the factors determining these differences between toys in the amount of the regression in constructiveness, we have first related the amount of the regression to the constructiveness of play in the free play situation. This relation is exhibited in the scatter diagram of Figure 29. There appears to be a very slight tendency for the toys of lower constructiveness in the free play situation to exhibit the smaller amount of regression in the frustration situation. It would seem unwise to attach any significance to this slight tendency. It may well be an artifact resulting from the unequal steps of the constructiveness scale.

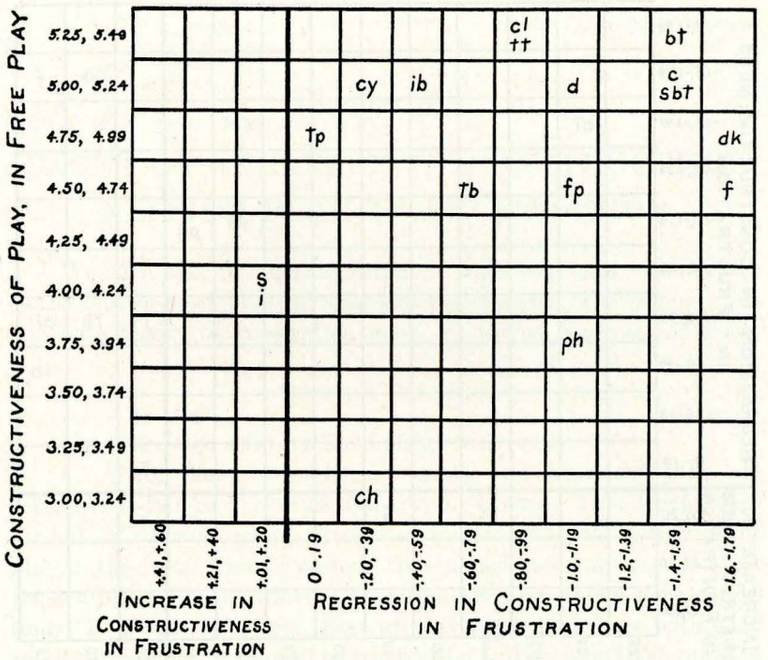


FIGURE 29. Relation between the Constructiveness of Play with Various Toys in the Free Play Situation and the Amount of Regression in Frustration
The toys are indicated by the same letters as in Figure 28.

As a final approach we have investigated the relation between amount of reduction in constructiveness and amount of change in attractiveness, Figure 30. Again no clear relation is obtained. Some toys, i.e., boat, cup, sailboat, fish pole, duck, phone, exhibit a great *decrement* in constructiveness from free play situation to frustration situation along with an *increase* in valence. Another group shows a similarly large regression in constructiveness along with a decrease in valence, i.e., duck and frog. A third group, truck, teddy, clay, and ironing board show a small decrement in constructiveness along with a decrease in valence. The remaining toys show few changes.

The result of this part of the inquiry is largely negative. While there are great changes in the valence of particular toys from free play to frustration and great differences in the amounts of the changes, we have been unable to gain any insight into the determining factors. It is clear that the valence of primitive toys, i.e., toys which are naturally used on a low constructiveness level, does not increase in the frustration situation. Regression in constructiveness is not caused by a process of selecting toys with which it is easy to play on a primitive level.

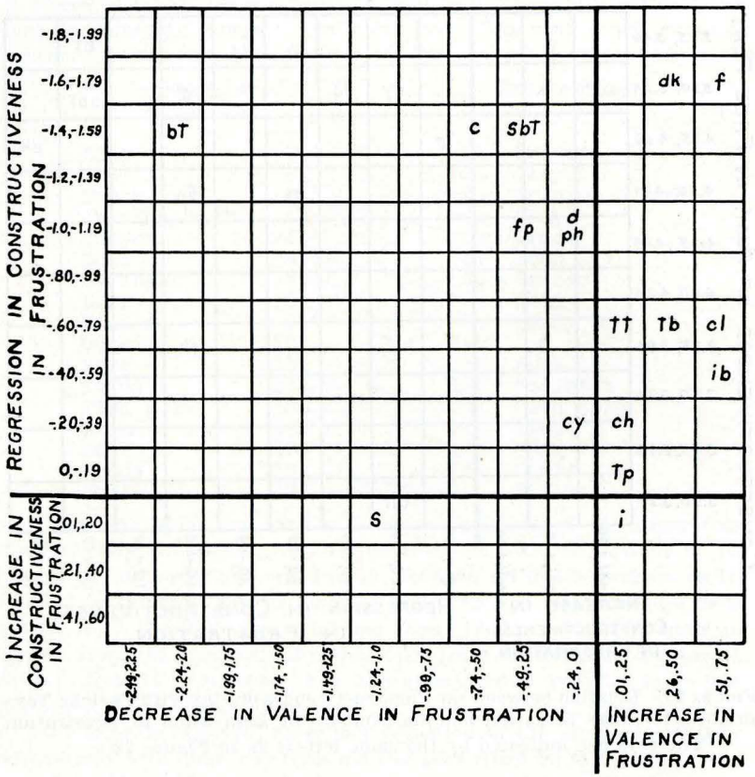


FIGURE 30. Relation between the Change in the Valence of a Toy from the Free Play to the Frustration Situation and the Amount of Regression

The toys are indicated by the same letters as in Figure 28.

We have been unable to find the factors determining the great differences in the amount of regression in constructiveness of play with different toys. The amount of regression is not related to the constructiveness of play with the toy in the free play situation or to the amount of change in valence. However, it is an important finding that the regression in frustration was not produced by a selection of primitive toys.

Chapter VII

CASES OF INCREASE IN CONSTRUCTIVENESS OF PLAY IN FRUSTRATION

We turn here to a consideration of the exceptional cases where constructiveness of play increased in the frustration situation. An adequate theory of frustration must, of course, account for them.

General Remarks

There are two striking facts about these cases:

1. All of them, when both primary and secondary play are considered, fall in the weak frustration group. This means that for half of the weak group there is an increase in constructiveness of play in the frustration situation. One immediately wonders if weak frustration may act to increase constructiveness under some conditions. It is true, of course, that we may be dealing here with such small differences in amount of frustration and such small changes in constructiveness that the techniques of measurements are too crude to indicate accurately the small changes occurring in individual cases. In considering the individual cases, one may wish to exclude increases in mean constructiveness of less than half a constructiveness point as of questionable significance and to exclude in addition, those cases where the increase in overt frustration behavior (barrier behavior, escape behavior, diversion) during the frustration situation is less than 100 seconds. There are left then, two cases where a rather impressive increase in constructiveness occurs in frustration, i.e., child 7, 1.88 constructiveness points increase, and child 18, 0.93 constructiveness points increase (See Tables 11, 12, and 14). We shall consider each of these cases separately.

2. A glance at Figure 24 shows that there is some tendency for the cases which increase in constructiveness in the frustration situation to fall near the bottom of the distribution of constructiveness scores for their mental age groups in the free play situation.

According to an accepted view, when one is dealing with an unreliable test the low scores on the first test would be expected to

increase on the average as a result of the shifting of the low scores to the mean.

In the present case the following may be said: (a) the tendency noted is very tenuous and (b) all of these cases fall within the weak frustration group. This makes it unlikely that the increases are the result of chance factors, i.e., the weak group was selected on the basis of the change in strength of frustration, an aspect of behavior not related to constructiveness and change in constructiveness.

Two Examples

In an attempt to gain some insight into the reasons for increase in constructiveness of play in the frustration situation, we have made an analysis of the two most striking cases.

Subject 18

The quantitative data for Case 18 may be summarized as follows: Chronological age, 49 months; mental age, 66 months. The record is given in Appendix 3.

	Free Play Situation	Frustration Situation
Constructiveness of play (primary and secondary)	4.83	5.76
Constructiveness of play (primary play)	4.83	5.76

Behavior in school

This child is characterized by the teacher as follows: "Quiet. Alert. An intelligent individual. Observing. She thinks first, and then asks questions. The children in the group like her, but she never organizes a play. She is interested in painting, and her interest in stories is very strong. She is an independent individual, and knows what she can and cannot do."

The experimenter in observing her in the school gained the impression of an individualistic child. She was seldom seen playing with other children, but usually watched them. She showed no childish movements, playful gestures or "silly" behavior. She was quiet and composed.

Preliminary play period

The child was free with the experimenter and willing to come to the experiment. During the preliminary play period, and also during other experiments, the child was on good terms with the experimenter. She made frequent contacts, showing what she did, and co-operating with the experimenter. At the same time she was very much absorbed in play of an individualistic sort as block building, drawing, peg board. In her reaction to the leaving suggestion of the experimenter in the preliminary play period, she showed a double attitude of co-operation with the experimenter and great interest in her play, which in this particular situation conflicted. When the leaving suggestion was made she co-operated by saying "yes," but her interest in the play was expressed by putting the blocks carefully back in place and making play of it.

This last behavior was also indicative of her tendency to finish what she did, to complete and complete fully the present action before going to something new. The clearness with which two situations were separated is important for an understanding of her behavior in the frustration experiment.

Relation to experimenter

It is important to note that social activities did not attract her, or cause her to feel inferior. In the preliminary period she did not want to play ball with the experimenter, excusing herself by saying that she could not do it. When the experimenter urged her to try, she co-operated but spontaneously returned to her private play (building blocks). She behaved toward the experimenter as to a benevolent observer which is the role which she herself played so often in the nursery school.

In the free play situation she did not try to draw the experimenter into her play. She kept to herself, drawing and playing with the peg board, but willingly showed the experimenter what she did.

Characterization of child by experimenter

At the end of the preliminary session the experimenter summarized those characteristics of the child which were of possible importance for an understanding of the free play situation and frustration as follows: (1) "The child is absolutely free and open with the experimenter. (2) She becomes completely absorbed in her play. (3) She talks freely. (4) Her great interest in play with pegs and crayons may prevent her from engaging in more expressive dramatic play." The same characteristics were observed in the experimental periods. To them should be added another which also appeared in both the experimental and preliminary periods, but which was not realized at the time the above notes were made; this was a tendency to fully complete a present action before starting another.

Behavior in free play situation

The full experimental record of the free play situation and frustration situation is given in Appendix 3. In the free play situation we find in the beginning a considerable amount of investigation of low constructiveness. This accounts, in some measure, for the lower mean constructiveness of play in free play. All play with the toys other than pegs and crayons was relatively low. This is consistent with her lack of interest in so-called dramatic play. In general, this child did not appear to be very deeply involved in the play.

Behavior in frustration situation

In the frustration situation we find the following episodes:

1. Very strong frustration with sudden transition to play (175 seconds)
2. Deep involvement in play with pegs and crayons (905 seconds)
3. Strong frustration, attempt to escape (75 seconds)
4. Deep involvement in play without overt frustration (80 seconds)
5. Irreal substitute (65 seconds)
6. Diversions and play (405 seconds)
7. Frustration (60 seconds)
8. Play (20 seconds)

This child exhibits symptoms of relatively intense frustration during barrier behavior. Practically only the second, fourth, and eighth episodes of the frustration experiment count so far as constructiveness is concerned and these involved primarily play with pegs, crayons, and beads.

We are faced with the question, why was play with pegs and crayons on the same level in frustration and in the free play situation?

In the beginning episodes this child appears to have been completely involved in the frustration situation. In the second episode she was as completely involved with the crayons and pegs. She appears most of the time in the experiment *either* in one *or* the other situation. We would suggest, therefore, that this child is not in an overlapping situation most of the time but is in a sequence of nonoverlapping situations during the frustration experiment. Undoubtedly the extent to which people enter overlapping situations varies greatly. In school and in the preliminary session this girl insists upon fully completing one task before starting another. This suggests that she lives in a succession of relatively separated psychological situations. Therefore, if the lowering of constructiveness in play, observed in other subjects, is caused by overlapping situations little reduction in constructiveness should be expected here.

Greatly affected when forced into overlapping situation

There is some evidence that in the fifth and sixth episodes the child is forced into an overlapping situation. After play with the pegs she immediately tried to leave. Being prevented in this, she seemed to be forced into an overlapping situation. In these episodes her play activities are on a very low constructiveness level (two short play periods of very low constructiveness). One could argue that when overlapping situations are forced upon this type of child the constructiveness should be reduced more than usually.

We may summarize our suggestions in the following way. The mean constructiveness of this child's play increases in spite of the fact that she was highly frustrated because:

1. The subject engaged in an unusually great amount of investigating in the free play situation. This activity is not resumed in the frustration situation, apparently because the child is satisfied with these activities in the free play situation. As a rule, we attempted to eliminate the initial investigating behavior in the free play situation from the records used for comparative purposes. However, this was impossible in the present case due to its extensiveness and because it was scattered throughout the whole period. Since investigation is on a low constructiveness level, its occurrence in this case lowers the whole level of constructiveness in free play.

2. Constructiveness was not decreased in the frustration situation over the free play situation because of this child's ability to make, during the greater part of the experiment, a break between successive situations; a series of different actions and an infrequent occurrence of overlapping situations are characteristic for this child. This interpretation is borne out by her behavior in nonexperimental situations.

It does not appear necessary to introduce new hypotheses to account for this case.

Subject 7

The quantitative data for Subject 7 are given below: Chronological age, 34 months; mental age, 35 months.

	Free Play Situation	Frustration Situation*
Constructiveness (primary and secondary)	3.06	4.94
Constructiveness (primary)	3.02	5.39
Constructiveness (maximal)	5.50	6.50

This child played in the free play situation on the lowest constructiveness level of any of the subjects. However, she ranks seventh in chronological age and fifth in mental age. In view of the correlation between constructiveness and chronological and mental age, it is possible that the play exhibited in the free play situation was not an adequate specimen of the child's normal play as far as constructiveness is concerned.

Preschool behavior

However, observation of this child in the preschool revealed that in general, she was less active than most of the children in her group. Her behavior in free play is not out of character. Frequently she sat watching the other children play for long periods of time without participating herself. While not abnormally lethargic, she clearly deviates in this rather than the hyperactive direction.

Low constructiveness in the free play situation

In the free play situation, immediately after the distribution of the toys the subject lay down at square 2 and began to color in a desultory way. She then stopped coloring and looked at experimenter making noises to attract his attention. After this she sat on the floor looking about. The experimenter was sufficiently impressed by her behavior to interrupt the experiment at this point and take the subject to the toilet, although it was routine procedure to ask about the need for the toilet before the experiment began. The record in Appendix 3 begins at the time of the return from the toilet.

* Possibly constructiveness of a few periods was rated too high in frustration. However this does not change the picture of a marked increase in constructiveness in frustration.

The experimental record is given in Appendix 3.

Lethargy: Passivity in free play

In the process of this interruption, square 3 with the lake toys and the basket used in distributing the toys, had become displaced, so that they were within reaching distance to square 1. It will be noted that upon her return, the subject sat in the same place on the floor near square 1 for the first 16 minutes. This is the only subject who displayed such passivity in this new, interesting play situation. The nature of the play in free play further gives the impression of lethargy. Not until the last play unit is activity greater than that involved in a passive manipulation of the available toys. The experimenter commented at the time that the child appeared to be extremely lethargic, displaying little initiative in using the toys, and little interest in exploring them.

Prefrustration period

In the prefrustration period this child expressed as much interest and delight as any child in the experiments. Upon entering the room she gasped with delight and stood looking for a moment with wonder. She exclaimed numerous times while she was exploring the toys.

Little overt frustration during frustration situation

She left the prefrustration toys without protest and made no comment when the barrier was lowered.

During frustration her only frustrated behavior was looking through the barrier at regular intervals. Aside from this, we have a picture of a busy, active child displaying considerable initiative in using the available toys.

This appears to be a case where constructiveness in the free play situation is very low due to the low tension-level of the subject. As we will discuss later, a certain minimal strength of force seems to be necessary in order to establish the maximal degree of differentiation and organization of behavior possible for an individual. The behavior of this girl indicates that the forces corresponding to the need for play are low; this is what the terms lethargy and disinterest used in describing this child mean. It is our hypothesis that in this case the forces corresponding to this dominant need were so weak that maximal differentiation and organization of behavior were not obtained. It is obvious that the forces corresponding to a need may be so weak that no overt behavior occurs even where there are no definite competing needs. Frequently a need, as the need to smoke, while clearly present, is so weak as to initiate no action. With this subject the level of tension in the free play situation seems to be above the level required to induce overt behavior, but below

that required for maximal participation of all parts and strata of the person.

In such cases of low tension it may happen that the introduction of a frustration situation will raise the levels of constructiveness of behavior. This is possible because in a frustration situation the need-tension and the strength of the forces may rise to (or closer to) the level required to completely organize all parts and strata of the person. We will come back to this question later.

There is ample evidence that in this case the tension of the child markedly increased in the frustration situation, as is shown by her great delight and interest in the prefrustration period. There is also evidence that she was in an overlapping situation, e.g., her regular turning to look through the barrier, though the potency of the overlapping frustration situation was apparently low. We suppose that in this case the loss of constructiveness resulting from being in an overlapping situation was more than compensated by the increase in total involvement of the person.

It is possible that similar factors account for most of the cases, which show a slight increase of constructiveness in frustration. The fact that they all occurred in weak frustration would be in line with such an assumption. However, there are, of course, many possibilities which may have created these exceptional cases.

Chapter VIII

EMOTION AND REGRESSION

The relation between emotion and regression can be viewed from two angles. (1) Emotional behavior can be considered to be a type of regressed behavior. (2) Emotion can be considered to be a cause of regression. In this chapter we will survey the emotional behavior occurring in our experiment without trying to separate the effect of emotion from that of frustration.

Emotion and Frustration

Methodology: Types of Emotional Behavior

When we come to deal with the quantification of emotional behavior, the problems of reliability of observation and validity of the interpretation become especially important, because of the short duration of many of the actions and the necessity for interpreting some of them at the time of their occurrence. In this connection we can offer little in support of the data we have to present. Of some importance, however, is the fact that here we are not so much interested in determining the absolute emotional state as we are in its change from the free play situation to the frustration situation and from episode to episode. If errors were relatively infrequent and did not vary systematically with the situations observed, the obtained differences in emotional expressiveness can be considered indicative of the true differences, even though the obtained statistical estimates of significance would in such a case be less than the true estimates of significance. We do not know of any reason for thinking that systematic variation in the accuracy of observation occurred from situation to situation. The same observer and experimenter dealt with the same child in all situations, and there was no systematic variation apparent in the difficulty of observation from situation to situation. The analysis in terms of behavior episodes was not made until all the observations were completed, so preconceived interpretations on the part of the observer could not have occurred.

singing, friendly conversation with the experimenter. On the basis of later results there is some reason for questioning the inclusion of humming and singing in the satisfaction group however, the ratings have not been recalculated with these actions omitted. The following actions were considered to indicate dissatisfaction (−1): sighing, crying, whimpering, complaints of tiredness, complaining tone, kicking and knocking, breaking and destroying, excessively loud singing and talking, restless actions, stuttering, thumbsucking.

We have made no attempt to differentiate in our rating scheme between more and less happy or unhappy emotional expression.

In Table 20 the mood indices of all subjects are given in the free play situation and frustration situation. In the free play situation, in twenty-eight out of thirty cases the mood index is positive. In the frustration situation this holds for seventeen subjects; thirteen show a negative mood index (dissatisfaction). The mean mood index in the free play situation is +259, and in frustration +45. In twenty-seven of the thirty children the mood rating indicates greater dissatisfaction in the frustration situation. The mean of the frustration situation-free play situation differences is —214.33 ± 29.44. This is rather conclusive evidence that on the average happy actions were more frequent in the free play situation than in the frustration situation.

Frequency and Duration of Specific Emotional Actions in Free Play Situation and Frustration Situation

The basic data respecting the occurrence of emotional behavior are presented in Table 21. Here the number and duration of the emotional actions of each subject, the total number and duration of emotional actions occurring in the group, and the number of subjects displaying each type of action are given. The critical ratios have not been computed. The trends may be summarized as follows:

1. Unhappy behavior is 8 times as frequent in occurrence and occupies 12 times as much time in frustration as in free play. Restless and aggressive behavior is 3.5 times as frequent in occurrence and occupies twice as much time in the frustration situation as in the free play situation.

2. Laughing, smiling, and gleeful singing, and talking decrease in frequency and duration in frustration situation to two-thirds of their frequency and half their duration in the free play situation.

3. Singing, and humming differ in free play and frustration only slightly. The finding that these activities do not vary in the same way as laughing, smiling, and gleefulness was surprising to us at first. Reconsideration and study of the original records suggests, however, that singing, and humming can have the characteristic of a "masking action" whereby the true situation of the child is

TABLE 20

MOOD INDICES OF SUBJECTS IN FREE PLAY AND FRUSTRATION SITUATIONS

Subject	Free Play	Frustration	*Fru-FPl*
1*	50	− 60	−110
2*	220	+ 90	−130
3	250	−115	−365
4	70	− 25	− 95
5	40	− 55	− 95
6	55	−115	−170
7*	−115	+345	+460
8	460	− 30	−490
9	485	+130	−355
10*	185	− 40	−225
11	95	−140	−235
12	450	− 75	−525
13	535	−140	−675
14	85	−215	−300
15	355	+ 10	−345
16*	30	+ 5	− 25
17*	195	+ 80	−115
18*	195	+ 25	−170
19	110	−210	−320
20	435	+170	−265
21	− 10	+120	+130
22	740	+265	−475
23	595	+285	−310
24	215	+270	+ 55
25	320	+165	−155
26	280	+ 55	−225
27*	110	−195	−305
28	650	+195	−455
29*	335	+260	− 75
30*	355	+290	− 65
Mean, total	+259.17	+ 44.83	−214.33±29.44
Mean, strong	+310.75	+ 27.25	−283.5
Mean, weak	+156.00	+ 80.00	− 76.0

* The asterisk marks the weak frustration cases.

TABLE 21

FREQUENCY OF OCCURRENCE AND ESTIMATED DURATION (IN SECONDS) OF EMOTIONAL BEHAVIOR IN FREE PLAY AND FRUSTRATION

Subject	Unhappy Actions*		Restless Actions*		Kicking and Knocking†		Happy Actions*		Singing and Humming		Friendly Conversation		Play Monologue	
	Free Play	Frustration	Free Play	Frustration	Free Play	Frustration	Free Play	Frustration	Free Play	Frustration	Free Play	Frustration	Free Play	Frustration
Frequency of Occurrence														
1	0	0	0	3	0	0	0	0	0	0	3	1	5	1
2	0	0	0	0	0	0	6	8	11	0	3	2	7	1
3	0	0	0	1	0	0	1	2	0	0	1	0	0	0
4	0	3	3	3	0	0	4	2	2	0	4	2	0	1
5	0	1	0	8	0	4	8	1	0	0	0	0	1	0
6	0	4	0	4	0	3	1	2	3	0	0	0	3	0
7	0	1	2	0	0	0	7	11	0	0	1	10	0	6
8	0	18	0	8	0	6	2	2	0	1	13	7	1	0
9	0	0	1	4	0	3	6	5	1	2	16	3	0	0
10	0	1	3	8	2	4	2	0	0	0	12	4	12	2
11	0	5	2	10	0	0	7	2	0	1	7	0	7	1
12	0	4	1	2	0	1	3	0	0	0	9	0	0	0
13	0	3	0	15	0	3	12	1	0	0	4	0	4	0
14	0	2	0	14	0	1	1	0	0	0	5	1	3	1
15	0	0	4	10	0	4	11	1	3	5	6	9	2	1
16	0	0	0	1	0	0	0	0	1	0	2	2	9	2
17	0	1	0	4	0	2	0	1	1	0	2	3	1	6
18	0	1	0	1	0	0	0	0	0	0	6	3	8	2
19	3	1	4	8	2	0	0	2	0	0	7	0	1	0
20	0	1	0	0	0	0	4	1	5	7	7	0	7	0
21	0	2	2	3	1	2	0	0	0	6	2	2	4	2
22	2	2	1	1	0	0	3	7	0	1	7	7	4	2
23	0	1	0	1	0	1	2	4	0	1	11	7	0	1
24	0	3	0	2	0	1	2	2	1	2	6	6	4	0
25	0	1	2	4	2	3	4	1	0	3	7	3	2	2
26	1	1	3	3	0	3	2	1	1	1	9	3	0	0
27	0	0	6	8	5	2	1	0	2	1	6	0	0	0
28	0	1	0	0	0	0	5	1	0	0	13	9	0	0
29	1	0	4	1	0	1	3	4	0	1	9	9	2	2
30	0	1	0	5	0	5	1	1	0	2	7	3	1	0
Number of subjects displaying	4	22	14	26	5	18	24	22	11	14	28	21	21	16
Number of actions	7	58	38	132	12	49	98	62	31	34	185	96	88	33

Subject	Unhappy Actions*		Restless Actions*		Kicking and Knocking†		Happy Actions*		Singing and Humming		Friendly Conversation		Play Monologue	
	Free Play	Frustration	Free Play	Frustration	Free Play	Frustration	Free Play	Frustration	Free Play	Frustration	Free Play	Frustration	Free Play	Frustration
Duration														
1	0	0	0	70	0	0	0	0	0	0	50	10	105	20
2	0	0	0	0	0	0	40	50	150	0	30	40	120	10
3	0	0	0	125	0	0	50	10	0	0	200	0	0	0
4	0	25	60	30	0	0	20	10	40	0	70	20	0	100
5	0	5	0	55	0	35	40	5	0	0	0	0	20	0
6	0	65	0	60	0	45	5	10	55	0	0	0	90	0
7	0	5	160	0	0	0	35	85	0	0	10	265	0	215
8	0	155	0	50	0	35	10	10	0	10	450	155	20	0
9	0	0	15	40	0	20	35	25	5	70	460	75	0	0
10	0	5	30	70	10	30	10	0	0	0	205	35	160	40
11	0	50	15	110	0	0	50	10	0	10	60	0	185	10
12	0	55	40	20	0	5	15	0	0	0	475	0	0	0
13	0	15	0	130	0	15	235	5	0	0	300	0	220	0
14	0	10	0	215	0	5	5	0	0	0	80	10	45	10
15	0	0	75	190	0	20	55	5	35	55	340	140	65	10
16	0	0	0	5	0	0	0	0	20	0	10	10	85	10
17	0	5	0	35	0	10	0	30	10	0	185	90	50	80
18	0	5	0	15	0	0	0	0	0	0	195	45	300	190
19	15	5	45	225	10	0	0	20	0	0	170	0	10	0
20	0	5	0	0	0	0	35	5	170	170	230	0	145	0
21	0	10	15	40	5	10	0	0	0	110	25	60	90	190
22	20	10	10	5	0	0	90	35	0	15	680	230	190	75
23	0	40	0	5	0	5	10	20	0	30	585	280	0	40
24	0	15	0	10	0	5	10	55	25	40	180	200	135	0
25	0	10	10	25	10	15	210	5	0	40	120	155	80	115
26	5	40	15	20	0	20	10	5	10	10	280	100	0	0
27	0	0	115	215	90	10	5	0	30	20	190	0	0	0
28	0	15	0	0	0	0	40	15	0	0	610	195	0	0
29	5	0	120	5	0	5	15	20	0	20	445	225	140	150
30	0	5	0	75	0	75	5	5	0	100	350	265	10	0
Number of subjects displaying	4	22	14	26	5	18	24	22	11	14	28	20	21	16
Estimated duration	45	555	725	1,845	125	365	1,035	440	550	700	6,985	2,605	2,265	1,265

*See page 188 for particular actions.

†The item kicking and knocking is presented here as a separate item in addition to being included under restless actions.

Since the frustration situation was a social situation in which the experimenter frequently played a very important role for the child, one might expect to find the children adopting a pleasant "front" for social reasons. This did occur upon occasions. Also, there is reason to believe that a characteristic reaction to mild frustration is an increased separation (withdrawal, self-control) of the person from his social environment so that the inner tension is not readily expressed. In such a state, superficial actions which do not reveal inner needs are frequent, and certainly singing and humming without glee are superficial routine actions.

4. "Friendly conversation with experimenter" and "play monologue" both show a decrease of about 50 per cent in frequency and duration in frustration.

These differences in emotional behavior in the free play situation and frustration situation may be descriptively summarized as follows:

1. There is a decrease in freedom of expression, i.e., in the self-revealing actions, in the frustration situation. This is revealed (1) by the decrease in play monologue and friendly conversation with experimenter, and (2) by the occurrence of masking, tactical social behavior in the frustration situation (See Appendix 6).

2. There is a decrease in the happiness of the mood in the frustration situation. This is shown by the decrease in happy actions and the increase in unhappy actions.

3. There is an increase in motor restlessness and hypertension as revealed by loud singing and talking, restless actions, stuttering, etc.

4. There is an increase in aggressiveness in frustration as indicated by the frequency of knocking, kicking, breaking, and destroying.

These data indicate that emotional expression as well as constructiveness of behavior is influenced by frustration.

Emotional Behavior in the Strong and Weak Frustration Groups

The mood index for the strong and the weak frustration cases is given in Table 20; the asterisk marking the weak cases.

For the strong frustration group the mean frustration situation-free play situation difference is −283.5 points and for the weak group it is −76.0 points. On the assumption that the true difference is 0 the probabilities of obtaining a difference of this magnitude is less than .001 for the strong group and between .2 and .3 for

the weak group. The difference between the weak and strong frustration groups is also significant between the 2 per cent and 1 per cent level. These data indicate that the extent of the difference in mood rating in the free play situation and frustration situation is to a significant degree a function of the strength of frustration, i.e., when frustration has a high potency, unhappy expressive behavior is relatively more frequent than when frustration is relatively weak. It should be recalled that the strong and the weak groups were identified in terms of the amount of time occupied with barrier and escape behavior, an indicator which is completely independent of the amount or nature of emotional expressiveness.

Emotional Behavior During Different Episodes

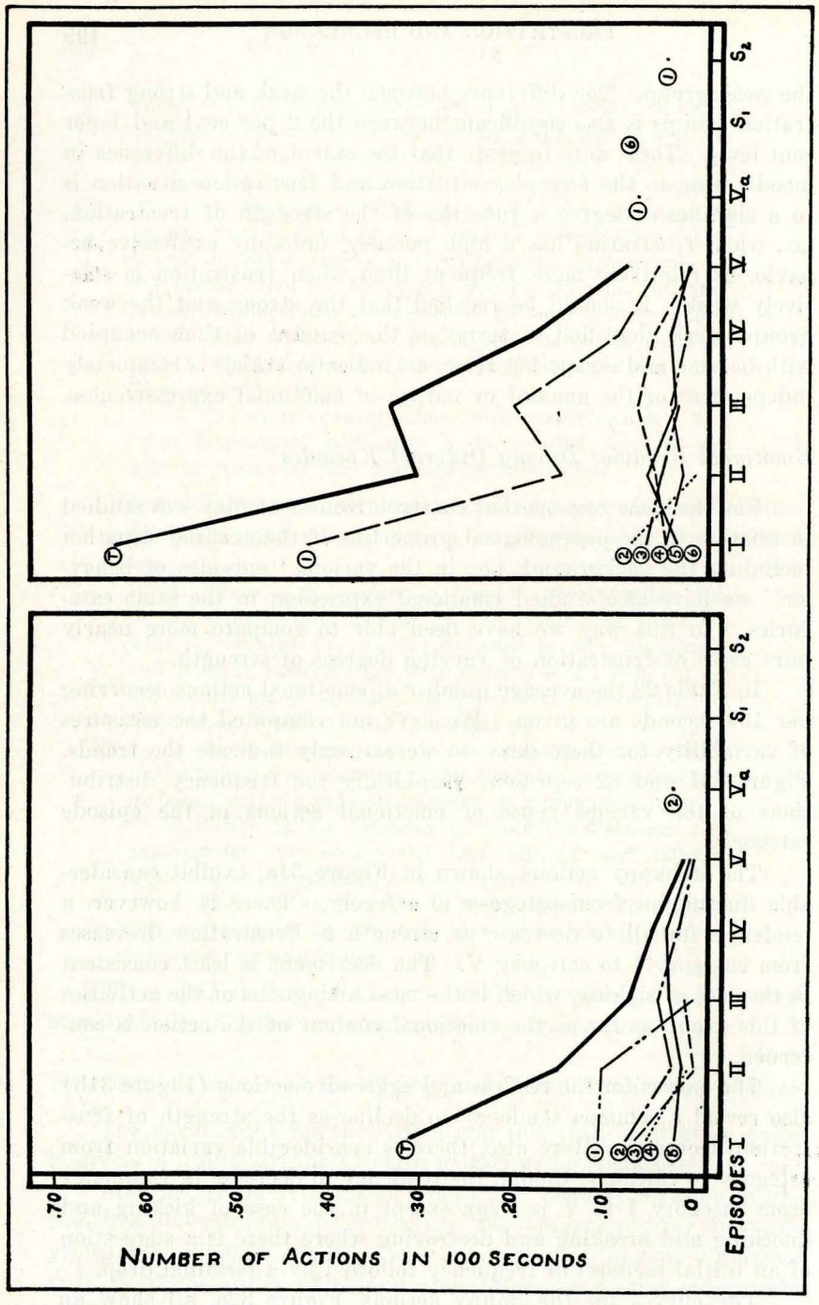
For the same reasons that constructiveness of play was studied in relation to the psychological properties of the existing situation including the background, i.e., in the various "episodes of behavior" we have also studied emotional expression in the same categories. In this way we have been able to compare more nearly pure cases of frustration of varying degrees of strength.

In Table 22 the average number of emotional actions occurring per 100 seconds are given. We have not computed the measures of variability for these data, so we can only indicate the trends. Figures 31 and 32 represent graphically the frequency distributions of the various types of emotional actions in the episode categories.

The unhappy actions, shown in Figure 31a, exhibit considerable fluctuation from category to category. There is, however, a tendency for all to decrease as strength of frustration decreases from category I to category V. The decrement is least consistent in the case of sighing, which is the most ambiguous of the activities of this group as far as the emotional content of the action is concerned.

The curves for the restless and aggressive actions (Figure 31b) also reveal a common tendency to decline as the strength of frustration decreases. Here also, there is considerable variation from category to category, though the tendency to decrease in frequency from category I to V is clear except in the case of kicking and knocking and breaking and destroying where there is a suggestion of an initial increase in frequency followed by a terminal drop.

The curves for the happy actions, Figure 32a, all show an



FIGURES 31a and 31b (See bottom next page for caption)

TABLE 22

POTENCY OF FRUSTRATION, PER CENT OF TOTAL EXPERIMENTAL TIME, AND AVERAGE NUMBER OF EMOTIONAL ACTIONS PER 100 SECONDS FOR EACH BEHAVIOR EPISODE CATEGORY AND FOR ALL SUBJECTS

Emotional actions	Behavior Episode Category									Total
	I	II	III	IV	(V	Va	S_1)	V, Va, S_1	(S_2)	
	Potency of Frustration									
	9.5	7	5	3	(.5	.5	?)	.5	(?)	
	Per Cent of Total Experimental Time									
	10.0	15.5	15.3	10.9	(39.4	4.7	1.4)	45.5	(2.8)	
Unhappy Actions										
Crying	.052	.007								.006
Whimpering	.063		.007							.007
Sighing	.021	.013	.027	.029	(.005		)	.005		.013
Complaints of tiredness	.073	.027	.041	.019	(	.022	)	.002		.021
Complaining tone	.104	.101			(.003		)	.002		.027
Total	.313	.148	.075	.048	(.008	.022	)	.009		.075
Restless and Aggressive										
Kicking and knocking	.031	.047	.068	.048	(.008		)	.007		.029
Breaking and destroying	.021	.054	.020	.029	(.008		.075)	.009		.021
Loud singing and talking	.031	.013	.027	.009	(.016		)	.014		.016
Restless actions	.427	.149	.198	.086	(.042	.066	)	.043	(.038)	.126
Stuttering	.073			.009						.008
Thumb sucking	.052	.040	.020							.015
Total	.636	.302	.334	.182	(.074	.066	.075)	.073	(.038)	.215
Happy Actions										
Gleeful singing and talking	.010	.020	.020	.029	(.071		)	.062	(.038)	.040
Laughing	.052	.087	.048	.057	(.098	.088	.451)	.108		.081
Smiling	.010	.027	.041	.086	(.069	.110	.226)	.078		.056
Total	.073	.134	.109	.172	(.238	.198	.677)	.248	(.038)	.177
Singing	.021	.047	.041	.038	(.087	.022	.451)	.091	(.038)	.063
Humming	.010		.034	.009	(.003		)	.002		.008
Friendly conversation	.104	.181	.204	.449	(.360	.264	.677)	.359	(.300)	.291
Play monologue	.000	.033	.123	.201	(.180	.242	.376)	.192		.133

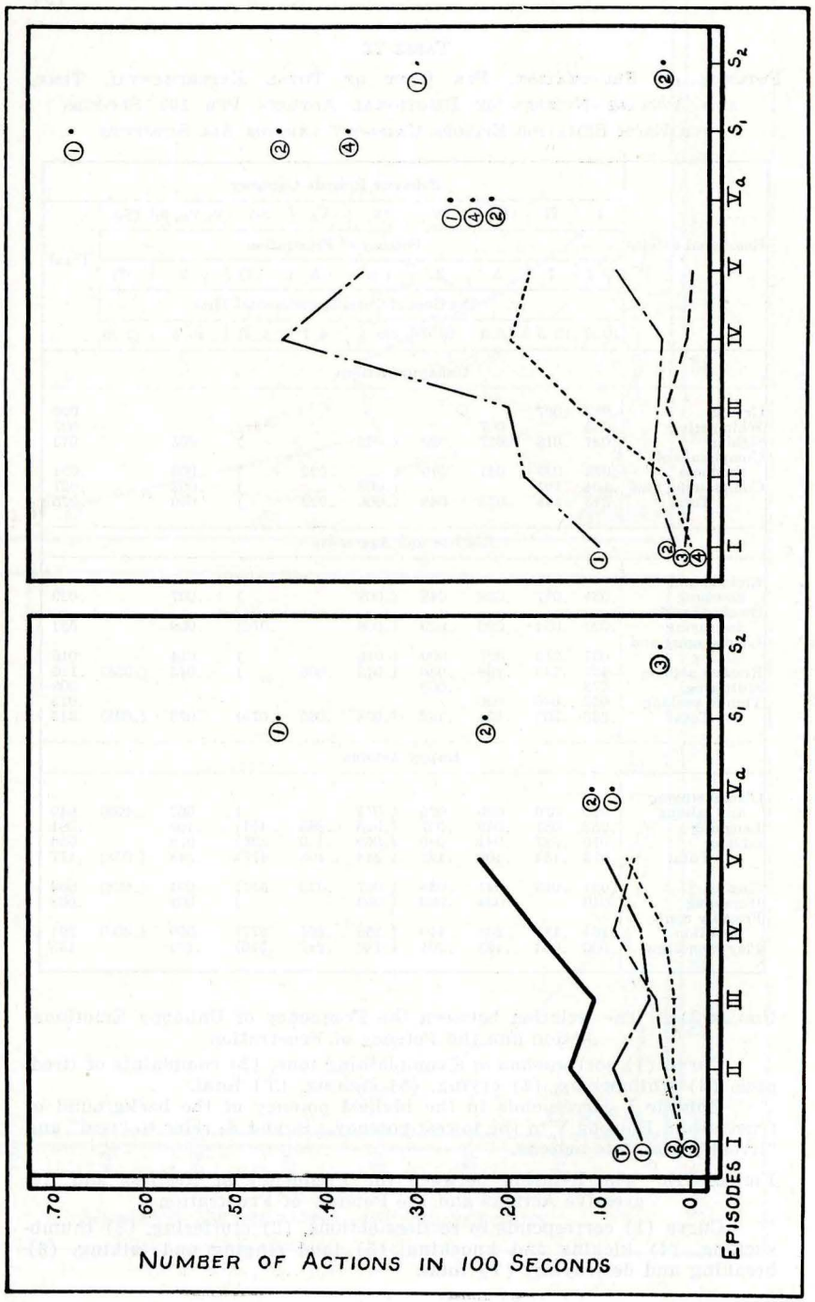
FIGURE 31a. The Relation between the Frequency of Unhappy Emotional Action and the Potency of Frustration

Curve (1) corresponds to a complaining tone, (2) complaints of tiredness, (3) whimpering, (4) crying, (5) sighing, (T) total.

Episode I corresponds to the highest potency of the background of frustration, Episode V to the lowest potency. S_1 and S_2 refer to "real" and "irreal" substitute actions.

FIGURE 31b. The Relation between the Frequency of Restless and Aggressive Actions and the Potency of Frustration

Curve (1) corresponds to restless actions, (2) stuttering, (3) thumb-sucking, (4) kicking and knocking, (5) loud singing and talking, (6) breaking and destroying, (T) total.



FIGURES 32a and 33b (See bottom next page for caption)

increase in frequency with decreasing strength of frustration. The frequency of laughing has the least consistency of trend from category to category.

In Figure 32b the curves for singing, humming, friendly conversation with experimenter, and play monologue are given. In the case of singing, conversation with experimenter, and play monologue, the duration tends to increase as strength of frustration decreases. With humming no clear tendency is revealed.

The groups of unhappy, restless and aggressive, and happy actions were formed originally on *a priori* grounds. The similarity of trends within each group seems to permit the combination of the frequencies of the individual items into a single curve for each type of emotional expression.

These three composite curves (T in Figures 31a, 31b, 32a) are in accord with the previous data from the frustration situation-free play situation comparisons: (1) a marked decrease in the duration of unhappy expressions and of restless and aggressive actions and an increase in the duration of happy actions accompanies a decrease in the strength of frustration. In addition, these data suggest the following points: (2) The duration of happy actions in category S_1 is markedly greater than in any other category. In this category all the "real" substitute approach and retrieving activities were placed. The great frequency of happy actions, therefore, is entirely in accord with the trend of the data. This difference in emotional behavior in categories V and S_1 constitutes in some measure a validation of the separation of the two categories on the subjective basis mentioned earlier. (3) Category S_2 includes those episodes where "irreal" substitutes occurred. Here we find evidence of a strong desire for the inaccessible toys reduced to some extent by fantasy satisfactions. Unhappy and restless actions are no more frequent than in category V. However, happy actions are less frequent than in category V; in fact they are no more frequent than in categories I and II. (Friendly con-

FIGURE 32a. The Relation between the Frequency of Happy Emotional Actions and the Potency of Frustration

Curve (1) corresponds to laughing, (2) smiling, (3) gleeful singing and talking, (T) total. The episodes are indicated in the same way as in Figure 31a.

FIGURE 32b. The Relation between the Frequency of Singing, Humming, Friendly Conversation, and Play Monologue, and the Potency of Frustration

Curve (1) corresponds to friendly conversation, (2) singing, (3) humming, (4) play monologue.

versation is high because a great deal of the substitute behavior involved talking about the inaccessible toy.)

The results for categories S_1 and S_2 suggest that in those cases where real substitutes occurred, emotional expressiveness became similar to that which would have occurred had the obstructed toys been obtained, i.e., there were no unhappy actions, few restless actions, and very frequent happy actions. In the cases of irreal substitutes the pattern of expressiveness was similar to that expected in complete satisfaction so far as the unhappy and restless actions are concerned, but the occurrence of happy actions was much less frequent than in a completely satisfying situation. These findings suggest that irreal substitutes reduce the pain and tension of frustration, but do not supply the satisfactions of reality, and are in line with common experience. On the whole, these results seem to confirm and extend somewhat the findings of Sliosberg (74) and Mahler (61).

Regression in Constructiveness of Play in a Case of High Emotional Tension

The parallel line between strength of frustration and intensity of emotion in our experiments makes any conclusion impossible as to the specific effect which each of these factors may have for constructiveness of play. It may, however, be appropriate to present an example of the relation of strong emotional tension and regression in more detail. Such an example can also serve as an illustration of the way in which various emotional expressions, particularly stereotyped behavior occurs within the flow of events.

Subject 13

The quantitative data for case 13 may be summarized as follows: Chronological age, 45 months; mental age, 51 months.

	Free Play Situation	Frustration Situation
Constructiveness of play (primary and secondary)	6.06	4.32
Constructiveness of play (primary play)	6.06	4.32
Constructiveness of play (maximal constructiveness)	6.50	5.50

The record of the free play and the frustration situation is given in Appendix 4.

Behavior in the free play situation, is characterized by a high involvement in play. Immediately after the free play experiment the following notes were made by the experimenter. "The child played from the start of the experiment by himself and played intensively during the whole time. The play was imaginative and each play unit developed from the preceding one. The child was happy and expressive; he talked some to the experimenter and a great deal to himself. He was socially free, but the social aspect of the situation was not dominant. Conversation was of an informative character. There was a matter-of-fact relationship to the experimenter. The child was self-sufficient in play and was not socially bashful."

Real play was begun almost immediately with the crayons; the constructiveness was remarkably high most of the time. The periods of play were long. There were only two nonplay periods of short duration and no attempts were made to leave the experimental situation. Thus, in the free play experiment no frustration was present. The child gave indication of playing on the highest level of constructiveness possible for him with the given set of toys. The constructiveness of this child in the free play situation was higher than that of any child with a similar mental age. Only children who were more than a full year older (mental age) showed a higher constructiveness level than subject 13.

The frustration situation produced very strong frustration in this case. The experimenter's impression of the emotional state of the child was such that after seven minutes of frustration she intended to terminate the experiment in order to relieve the pressure upon the child. However, as this was about to be done, the behavior of the child indicated that the frustration had begun to lessen.

Reading of the record will provide the best general impression of the frustration behavior. Here we will describe different types of effects produced.

1. The child became very restless; he moved purposelessly from one side of the barrier to another a great many times. This is typical behavior for human beings and animals in strong emotional tension. This behavior is not (or is only to certain degree) a directed action controlled by the intention to reach the goal (such as round-about behavior) but is an uncontrolled expression of tension. These restless movements were carried out along the barrier, i.e., they occurred in such a way that the distance to the unattainable goal was not changed (53).

2. The above mentioned activity sometimes gave way to movements about the room which resembled staggering. The child moved in circles, turning around at the same time and sometimes seemed as if he were

being turned or pushed from the outside. He moved not only forward, but sidewise at various angles and backwards. It seemed that the hierarchical organization of the motor functions which co-ordinate a sequence of motor actions into one unit was lost to a rather high degree.

It is of interest to note that the organization of the motor function can be treated similarly to the constructiveness of play. Actually very similar phenomena seem to be involved. It appears that in restlessness, described under (1), the higher centers of hierarchical organization which subordinate a larger sequence of actions under one guiding idea, such as a "purpose," are lost. However, the movements of the different parts of the body are sufficiently organized to preserve proper balance and posture. In the case described under (2) above even this low level of organization is disturbed.

3. This child showed another rather common type of frustration behavior: stereotyped repetition of the same sentence. Such sentences as, "Will you give me some water in this cup" were repeated many times in immediate succession with very little change in voice. To some degree these repetitions are actual social attempts to overcome the barrier. Sometimes this component seems to be very strong. During these stereotyped repetitions the child goes to the experimenter and tries to force him to listen. However this is not the full story. The stereotyped repetitions often have, at least to some degree, the nature of a monologue not intended as social pressure on the experimenter. In this case they appear to be merely expressions of wishes, or gesture-like barrier behavior. They can be looked upon as restless movements along the social barrier.[26]

To repeat a sentence over and over again instead of proceeding from one sentence to the next within a larger context is a rather clear example of decreases in hierarchical organization of speech. Larger units containing a sequence of different sentences organized to transmit certain ideas to another person are replaced by relatively small units of language each containing but a single sentence. This is a change which Karsten (37) has called "disintegration of a whole" (*Gestaltzerfall*) and is frequently found in oversatiation.

The parallel between stereotyped repetition of sentences and restless movement is rather striking. Both are of a definitely lower level of hierarchical organization than most of the directed actions and speech of this child. In both cases the subject keeps close to the physical or social barrier between him and the inaccessible toys. However, in each case he does not actually try to overcome the barrier.

4. In the frustration situation the child frequently showed noncompletion of sentences, mumbling, and stuttering. We have to deal here with a disorganization of speech which is even more serious than in stereotyped repetition. The level of hierarchical organization is still further lowered. In stereotyped repetition speech loses its purposefulness

[26] This child, who is characterized as emotional in general, showed some stereotyped repetitions in the free play situation, also, although they were much less frequent.

though the organization of the individual sentences is adequate. In case of stuttering and mumbling, however, the smaller units, and sentences and even the words, are disorganized and disintegrated. A level is reached similar to the organizational level of the motor functions of the intoxicated person.

It seems that disorganization or regression in speech can be linked definitely with frustration. The subject was known to have stuttered occasionally in the school and at home, but it was not a serious problem. In the free play situation, the child played with great eagerness, and displayed considerable joyful excitement over the new toys. He talked a great deal to the experimenter and in his play, yet no instances of stuttering occurred in free play situation. In the frustration situation on the other hand, a great deal of stuttering and incoherency occurred but even here it occurred only when the child was in the barrier region, i.e., when expressing his thwarted desire to cross the barrier. When the child turned from verbal actions expressing his frustration to conversation with the experimenter, comments about the window, the available toys, etc., no stuttering appeared. The change in the character of speech under this circumstance was quite dramatic.

Stuttering did not occur in every case when the subject entered the frustration region. The record indicates that stuttering only appeared when the degree of tension was rather high as shown by other behavioral evidence. Notable in this connection was the change in the voice from a soft, low quality at times when stuttering did not occur, to a harsh, whining quality when it did. The record shows, too, that general motor restlessness and other types of disorganization occurred at these times.

5. Only seven very brief periods of play occurred in the frustration situation. Of these, five were very primitive manipulation of the cup and saucer or the telephone. Two periods of play, with the truck and crayons, were on a considerably higher level, but were very brief. It is clear that during most of the frustration situation the degree of hierarchical organization and the level of creativity of this child's behavior was decreased.

This case is presented as a prototype of regression under high emotional tension. This child showed a very marked regression in constructiveness of play, and a similar regression in the level of hierarchical organization and the size of behavioral units of his speech and other types of motor behavior.

In the light of the examples of emotional behavior, which we discussed in the first part of this chapter, one easily sees that most of the symptoms which increase in frequency in the frustration situation have a relatively low hierarchical level of organization. Sighing, whimpering, crying, and even such actions as kicking and breaking, usually contain a less complicated level of hierarchical organization and smaller units of action than most of

in a free play situation and in a frustration situation for half an hour on different days. A record of all behavior was made and the effect of frustration on the constructiveness of play was determined.

Constructiveness of Play in Free Play Situation

1. A seven-point constructiveness scale was developed on the basis of which each play unit of each child in both the free play and the frustration situation was rated.

2. The constructiveness of play with the same toy varies greatly from child to child.

3. The mean constructiveness of primary play in the free play situation is correlated +.81 with both mental and chronological age.

4. The constructiveness of play is positively related to length of play unit.

5. The constructiveness of play is lower for secondary play (play which occurs simultaneously with another nonplay action) than for primary play (play which receives the full attention of the child).

6. The qualitative analysis indicates that constructiveness of play measured by the scale is related to degree of differentiation, degree of hierarchical organization, originality, and adequacy of play behavior.

The Strength of Frustration in the Frustration Situation and Mood

1. The amount of time spent in attempts to overcome the barrier to the inaccessible toys by physical or social means (amount of barrier behavior) varies greatly from child to child.

2. The amount of time spent in trying to leave the experimental room by physical or social means (escape behavior) is positively related to the amount of barrier behavior.

3. The proportion of the total time occupied with barrier and escape behavior in a situation such as the frustration situation can be used as a measurement of the average strength (potency) of the background of frustration during the experimental period.

4. The potency of a background of frustration can be measured for a given natural "psychological episode" by determining the proportion of the total time occupied with barrier and escape behavior in that episode.

5. In the frustration situation freedom of expression as indicated by play monologue, and friendly conversation with experimenter, decreases; and masking social behavior increases.

6. The frequency of happy actions decreases and of unhappy actions increases in frustration. This change is positively related to strength of frustration.

7. The frequency of restlessness and of aggressive actions is positively related to the strength of frustration.

Regression in Frustration

1. A background of frustration decreases the average constructiveness of play with accessible toys. On the average, the constructiveness regresses by an amount equivalent to 17.3 months mental age. For the younger subjects, 28 to 41 months of age, this average regression is 9.6 months; for the older subjects, 42 to 61 months of age, the average regression is 21.5 months.

2. The maximum constructiveness of play decreases in frustration; although not as much as the average constructiveness of play.

3. The amount of secondary play increases in the frustration situation.

4. The average length of play units decreases in the frustration situation with the strong frustration group.

5. The lowering of the constructiveness of play in frustration is partly due to the increase in the amount of secondary play and to the decrease in the average length of play unit. However, the decrease in constructiveness holds, also, for primary play of the same length of play unit in the free play situation and frustration situation.

6. The amount of regression in constructiveness of play is a function of the strength of frustration. This is shown by the difference in the effect on children showing strong or weak frustration in the experimental setting, and by a comparison of behavior of the same children under different strengths of frustration.

7. In the strong frustration group the regression was equivalent to 24 months, and in the weak group to 4 months mental age.

8. The greater regression in strong frustration holds also for primary play and for play units of the same length.

9. The amount of regression in the constructiveness of primary play of equivalent length of unit in the free play situation and the frustration situation is positively related to the relative strength (potency) of the background of frustration.

10. A background of weak frustration in some cases seems to increase the constructiveness of play.

11. If the play unit with the accessible toys takes on the meaning of a substitute for the inaccessible toys, the mood of the person will under certain conditions be happy and the constructiveness level of play will not indicate regression.

12. Constructiveness of play is not related to the preference for particular toys. The regression in the constructiveness of play is not due to the selection in frustration of toys with a naturally low constructiveness level.

13. The amount of negative emotionality increases with the strength of frustration.

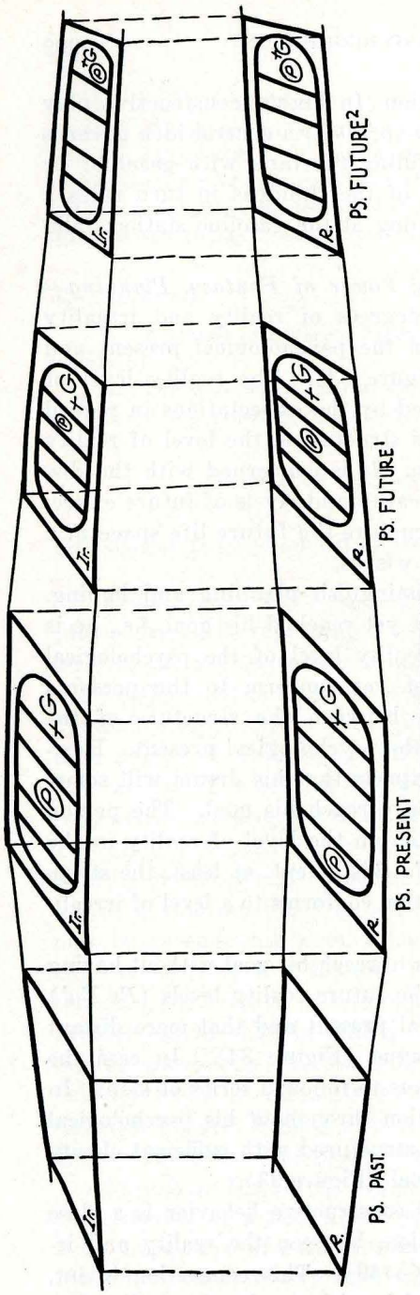


FIGURE 33

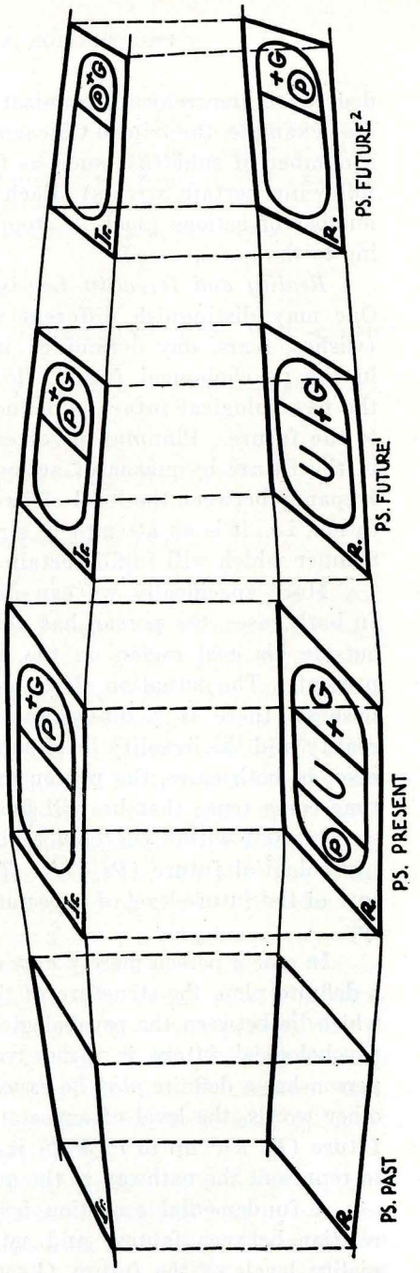


FIGURE 34

(See bottom next page for captions)

In this case the structure of the future reality level is unrelated to that of the irreality level. Such a functional separation may have either of two effects. The wishes (and fears) may become unrestrained by any consideration of what will be realized or the action may become "realistic" in the narrow sense of not being guided by long range planning. In terms of powerfields, this situation can be characterized in the following way. The individual does not believe he has power to form the world according to his wishes.

From this it is understandable that an essential factor for the constructiveness of play is what has been called "power of fantasy." Constructiveness of an activity may be low as a result of a lack of connection with fantasy. On the other hand, constructiveness may be low because of too little realism. Planning involves a mutual influence of the structure of the reality and irreality level on the psychological future. If the potency of the reality level, (Escalona, 15), becomes too small, the plans of the individual become "fantastic." What has been called inadequacy in the treatment of toy material is probably related to this lack of realism.

These considerations make it comprehensible why there is a small and uncertain difference between highly constructive activity and unconstructive, utopian behavior. A constructive plan

FIGURE 33. Time Perspective in Planning

PS. Past, psychological past; PS. Present, psychological present; PS. Future¹, the near future; PS. Future², the more distant future. All are represented as seen by the person at time for which the life space is represented. *R*, level of reality; *Ir*, level of irreality; *P*, person; *G*, goal.

Differences in degree of reality and differences in psychological time dimension are conceived of as two different dimensions of the life space existing at a given time. The representation of the psychological time dimension in a discontinuous manner is merely due to the technical difficulty of representing a four-dimensional space on paper.

There is a discrepancy between the structure of the level of irreality and reality in that on the level of wishes (*Ir.*), the person sees himself closer to the goal than on the level of reality. However, there is some point in the psychological future where the person expects, on the level of reality, to reach the goal. In addition, the intermediate steps on the level of reality are envisaged.

FIGURE 34. Time Perspective and Hope (without Definite Planning)

The meaning of the symbols is the same as in Figure 33.

Also in the case of mere hope, somewhere in the psychological future the person sees himself in the goal region on the level of expectation (R). However, the intermediate regions between the present position and the goal region are unstructured (U) and the position of the person in the near future is undetermined.

is a long range plan; its constructiveness tends to increase, at least in certain respects, with the amount of discrepancy between the present and the reality level of the future. If, however, the discrepancy increases beyond a certain limit the plan loses its connection with reality and its constructiveness.

Momentary and Maximal Constructiveness of the Child.—The actual constructiveness of the individual's behavior does not always represent his maximal possible constructiveness even in such free situations as play. For a given child the constructiveness of his behavior seems to vary below the maximum in inverse relation to the degree to which the person is involved in the activity. In other words the constructiveness of an individual's behavior is a positive function of the proportion of the total personality which enters into it. This proportion in turn depends upon the relative potency of the situation corresponding to the activity.

Simplified Quantitative Theory of Constructiveness

It is possible to derive most of our results respecting the constructiveness of play from the following theorem:

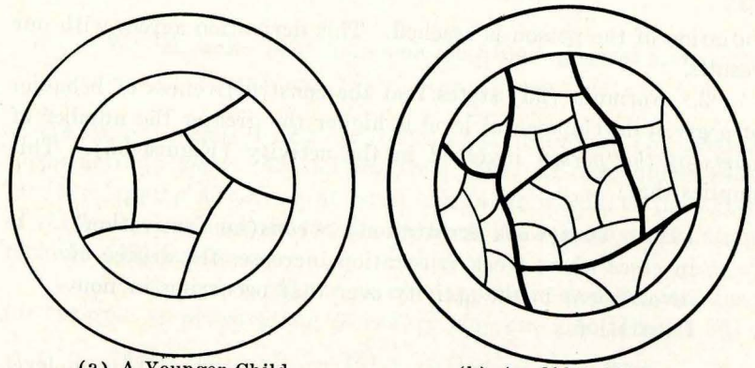
$$(39) \quad cons\ (A) = F(n\ c(A))$$

In this formula $cons(A)$ refers to the constructiveness of an activity A, n to the number of cells (c) involved in the activity A. In view of our discussion of constructiveness it is not necessary to state that this formula is oversimplified. However, it permits the derivation of the main facts surprisingly well. This may be because of a high correlation between the number of cells of a person involved in an activity and such other factors as the degree of hierarchical organization of the systems involved in the activity.

1. From this theorem (**39**) together with the statement concerning the increasing differentiation during development (**5a**) it follows that the *maximum constructiveness of a person* increases with age (Figure 35). For the maximum number of cells involved in an activity is obviously a function of the total number of cells contained in the whole person.

$$(40) \quad cons\ (P)^{max} = F(MA)$$

$cons(P)^{max}$ means the maximum constructiveness of a person and MA is mental age at the stage where the highest degree of differ-



(a) A Younger Child (b) An Older Child

FIGURE 35. Degree of Differentiation of the Person

The younger child is less differentiated than the older. Certain functional parts of the older child show greater independence from each other (indicated by thickness of the boundary line) than corresponding parts of the younger child.

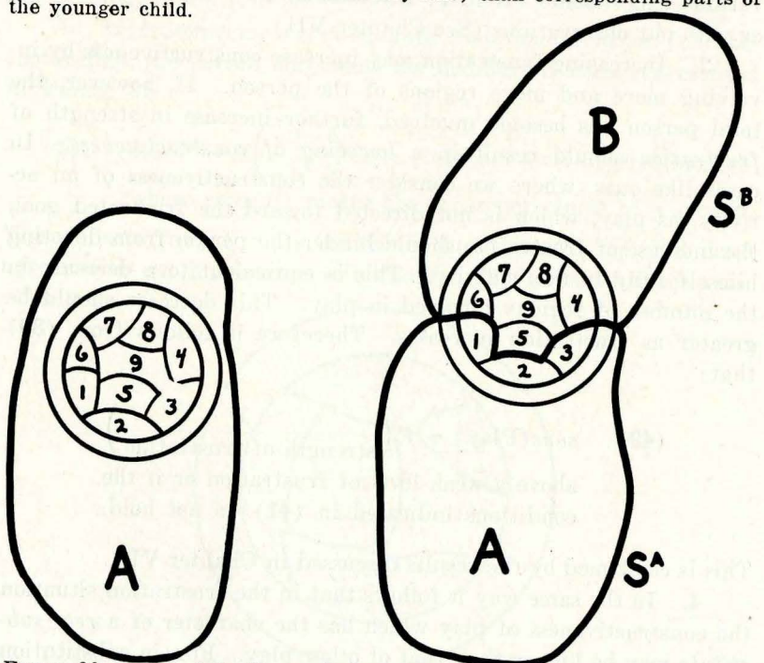


FIGURE 36. Areas of the Person Related to an Activity in Which the Person is (a) Fully Involved (b) Less Involved

A and B, different activities; S_A and S_B, situations corresponding to these activities. In case of a non-overlapping situation (Figure 36a), the total person is involved in the activity A; in case of an overlapping situation (Figure 36b) only the peripheral regions 1, 2, 3 of the person are involved in the activity A.

entiation of the person is reached. This derivation agrees with our results.

2. Formula (**39**) states that the constructiveness of behavior at a given developmental level is higher the greater the number of *parts of the person* involved in the activity (Figure 36). This implies that:

(**41**) *cons*(weak frustration) > *cons*(nonfrustration) in cases where weak frustration increases the degree of involvement in the activity over that occurring in nonfrustration.

Weak frustration actually may increase the general tension level and also the force in the direction of the goal follows from theoretical considerations (Lewin, 53; Wright, 83) and is well in line with various experiments (Ach, 1; Birenbaum, 6; Wright, 83) as well as with our observations (See Chapter VII).

3. Increasing frustration may increase constructiveness by involving more and more regions of the person. If, however, the total person has become involved, further increase in strength of *frustration* should result in a *lowering of constructiveness.* In cases like ours, where we consider the constructiveness of an activity, as play, which is not directed toward the frustrated goal, the increase of frustration should hinder the person from devoting himself fully to this activity. This is equivalent to a decrease in the number of regions involved in play. This decrease should be greater as frustration increases. Therefore it follows from (**39**) that:

(**42**) $cons(\text{Play}) = F\left(\frac{1}{\text{strength of frustration}}\right)$ above a weak level of frustration or if the conditions indicated in (**41**) do not hold.

This is confirmed by the results discussed in Chapter VI.

4. In the same way it follows that in the frustration situation the constructiveness of play which has the character of a *real substitute* may be higher than that of other play. For, in substitution the total person can again be involved in one activity rather than being split into different activities each involving less than the total person.

5. We can write (**42**) in a somewhat more general form:

(**43**) $cons(A) = F(Po(S^A))$

where $Po(S^A)$ means the *Potency* (*Po*) *of the Situation* (*S*) related to the activity (*A*). (**43**) follows from (**39**). If one applies (**43**) to "overlapping situations at large" in other words, to the *effect of the background within the life space* on the immediate situation formula (**42**) results.

6. If one applies (**43**) to an overlapping immediate situation, for example, to *primary and secondary play* one gets (Figure 36):

(**44**) *cons*(primary *Pl*) > *cons*(secondary *Pl*)

In other words, primary play should show greater constructiveness (with the same person) than secondary play. This is in line with our results.

7. If frustration increases until *emotional tension* (*et*) becomes high, the person may show the dedifferentiation represented in Figure 37.

(**45**) $cons(P) = F\left(\frac{1}{et(P)}\right)$ above a certain level of emotionality

where $cons(P)$ means the constructiveness of a person. This follows from the discussion in the Appendix (p. 232) and agrees with our observations in Chapter VII concerning the rela-

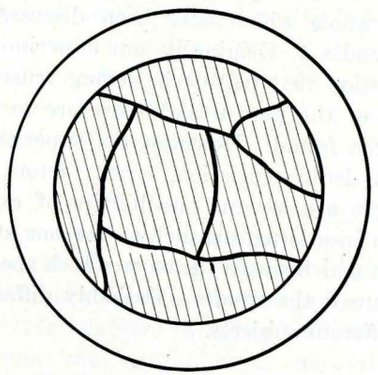


FIGURE 37. Regression Due to High Tension

Schematic representation of a person on the developmental level of an older child (corresponding to Figure 35b) in a state of high tension. The degree of differentiation is decreased (compare Figure 42d in regard to the relation between tension and dedifferentiation).

To be governed by two strong goals is equivalent to the existence of two conflicting heads within the organism. This should lead to a decrease in organizational unity according to our theoretical considerations (formula (**36**), p. 260).

Finally, a certain disorganization should result from the fact that the motor system loses to some degree its character of a good medium because of these conflicting heads. It ceases to be in a state of near equilibrium. The demands on the motor system made by one head have to counteract the influence of the demands of the other head. This is an additional factor which hampers organizational processes.

Lack of Time Perspective: Insecurity

The extension of the life space, particularly in the psychological time dimension, is one of the essential properties of development. We have seen that planning presupposes time perspective. On the average, constructiveness is higher in the long than in the short play units. Therefore a decrease in the extension of time perspective might properly be regarded as a regression.

In the frustration experiment, the experimenter interrupted the elaborate play with the beautiful toys and ordered the child to move to the other side of the partition. In the previous free play situation and in prefrustration, the child had not been interrupted. In some degree the child had probably become confident that his play would not be interfered with, and his security was such that he was able to make relatively long-range plans.

The interference at the end of the prefrustration situation may have shattered the belief of the child in the security and stability of his situation. If the possibility of a superior power, such as that of the experimenter, interfering at any moment continued, it might not seem worth while to start a long-range plan. This should lead to a weakening of the connection between the reality and irreality levels and to a narrowing of the life space with respect to the extension of the level of reality (level of expectation) into the psychological future. It is possible to attribute regression in the frustration situation at least partly to the lack of security.

Closely related to this aspect of the situation is the change in "freedom of expression." The child's relation with the experimenter, as well as his other symptoms indicate that the child in the

frustration situation feels more restricted. This is tantamount to saying that the child feels he is not permitted to reconstruct his reality level according to the wish level or to his more intimate needs. We have seen that this should lead to a lowering of the constructiveness level.

The decrease in time perspective during play can be related in part directly to the greater emotionality in frustration. It is known that a strong emotion tends to narrow the extension of the psychological situation.

Regression and Substitution

Freud has linked regression closely to substitution. It may be appropriate therefore to relate the results of our experiments to this theory.[27]

We do not deny the possibility that regression may under certain conditions result from a tendency to substitution. However, this is hardly the cause of regression in this experiment. Of course, it can be maintained that the accessible toys are a substitute for the inaccessible toys. However, even if the accessible toys did have the character of substitute toys, there is nothing to prevent the children from playing on the same constructiveness level as before. Regression, in this case at least, is not an attempt to satisfy a need on a lower level because it cannot be satisfied on a higher level. It is rather the effect of a change of the state of the person resulting from tension or from any of the changes in the life space which we have discussed.[28] When play with the accessible toys had the character of a real substitute for play with the inaccessible toys the constructiveness increased; it did not regress to a lower level.

Methodological Results and Constructs

Methodology

The following methodological points seem to have rather general implications.

1. For studying psychological processes it is important to use

[27] It should be remembered that the Freudian concept of regression includes retrogression in addition to regression as defined here. The two concepts have somewhat different implications.

[28] This view is somewhat in line with that of McDougall (60).

psychological rather than physical time units. We have distinguished three units of different length: units of action, episodes of behavior, and total experimental periods.

2. There is a close relationship between the size of the psychological situation and the length of the period which has to be observed, if one wishes to determine the situation at a given moment.

3. It is possible to speak of an overlapping situation not only in regard to the immediate situation, but also in regard to the situation at large. The relative potency of the immediate situation and the background situation can be measured. This seems to be of special importance in studying the influence of the background of a situation in the field of personality.

4. Play can be used as an indicator of the developmental level of a person at least between two and six years of age.

Constructs and Theories

It is possible to define the following concepts in rather exact terms: the degree of dependence, the degree of unity and of differentiation of a whole, the concept of natural part and natural whole, central and peripheral layers, and outer and inner layers. On the basis of these concepts, statements can be made concerning the variety of patterns which can be realized by a whole, the conditions of regression, and similar questions. It is important to distinguish simple dependence and organizational dependence, and the different types of unity based on these types of dependence. These concepts may help to determine more adequately the differences between the various levels of development.

A simplified theory concerning constructiveness is brought forth linking constructiveness with the number of interpersonal systems involved in the activity. The relation between constructiveness and the reality and irreality levels of the life space are discussed, particularly the relation to hope and planning.

The regression in our experiment can be linked to any one or all of the following factors: the differentiation and disorganization due to emotional tension; the differentiation and disorganization due to the person being in an overlapping situation; a decrease in security and a correlated decrease in the extent of time perspective.

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APPENDIX

Appendix 1

ANALYSIS OF THE CONCEPTS WHOLE, DIFFERENTIATION, AND UNITY

DIFFERENTIATION AND UNITY OF A WHOLE BASED ON SIMPLE DEPENDENCE

The Concept of Dependence and Degree of Differentiation of a Dynamic Whole

Since Köhler's *Physische Gestalten* (42) the definition of a "dynamic whole" has been based on the dependence of its parts. This definition holds good for physical, psychological, and sociological wholes (54).

Recently Grelling and Oppenheim (29) and Grelling (27) have undertaken a logical analysis of the concept of functional whole. They distinguish correctly between logical and causal dependence. It is clear that we are dealing here with causal dependence. We will limit our discussion as much as possible to problems of dependence which have a bearing on the question of differentiation of a dynamic whole.

Degree of Dependence, Independence and Interdependence.—It should be clear from the outset that dependence or independence within a whole is a matter of degree. Parts within a whole are interdependent but, at the same time, they are usually independent to some degree.[29] In other words, part a will not be affected, as long

[29] Grelling and Oppenheim (28) mention occasionally that the different degrees of "empirical dependence . . . can be taken account of by introducing the notion of probability." Such a definition would, we suppose, distinguish degrees of dependence by its regularity (with correlation=1, or "lawfulness" as the highest degree). The term, degree of dependence, in this study does not refer to the degree of regularity of dependence but to the amount of change in one part, which is without effect on the other part. We assume here strict "lawfulness" also for small degrees of dependence.

as the alteration of part b is within certain limits. However, if the change of b surpasses this limit, the state of a will be affected.

More formalistically one can proceed as follows: $s^1(a)$, $s^2(a)$ may indicate the state (quality) of a region (system) a at the time 1 and 2; $ch(a)=s^2(a)-s^1(a)$ may indicate the change in the state of a. It may be further assumed that two regions (a and b) show the same state at the beginning: $s^1(a)=s^1(b)$. The independence of a region a from region b ($indep\ (a,b)$) may then be defined as the maximum change in b which would leave the state of a unchanged, or would change it less than a small amount ϵ.

(13) $indep\ (a,b)=ch^{max}(b)$, which leads to $ch(a)<\epsilon$

The degree of change of b ($ch(b)$) which does not affect a is not necessarily the same for different values of s, (for example for a low and a high tension level). To eliminate this question we may refer always to the same absolute beginning level, that is, to a definite value of $s^1(a)$.

The degree of dependence of a on b ($dep(a,b)$) can be defined as the inverse of independence.

$$(14)\quad dep(a,b)=\frac{1}{indep(a,b)}$$

This definition of dependence and independence is not limited to neighboring regions. It can be used for any co-existing empirical regions (parts of a field).

The degree of independence of two regions a and b will usually be different for different kinds of change (change of different qualities). Therefore, when comparing different cases we will always refer to the same kind of change.

The independence of two regions a and b can be different in different directions ($indep(a,b) \neq indep(b,a)$). We can define the degree of interdependence of a and b, ($interdep(a,b)$) in the following way if the properties of the system are such that $dep(a,b)=dep(b,a)$.

(15) $interdep(a,b)=dep(a,b)$ if $dep(a,b)=dep(b,a)$

Simple Dependence of Neighboring Regions.—For the following discussion it is convenient to speak of the degree of independence of region a from a neighboring region n ($indep(a,n)$). The

curve we call subparts of the same "natural" part, or of the same "cell" of the whole. For instance, 1, 2, 3 belong to one cell (c'); 4, 5, 6, 7, 8, 9 to another cell (c''); 10, 11, 12 to c'''.

The curve representing the degree of independence for a whole containing natural parts may under certain circumstances drop. Such a case is represented by curve 39 which corresponds to the whole represented in Figure 40.

The difference between the whole in Figure 5 and 6 can be

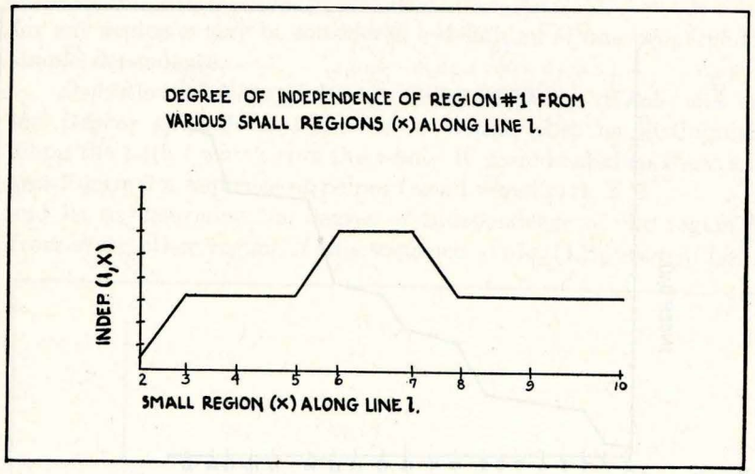


FIGURE 39. Degree of Independence of Regions in a Whole Represented in Figure 40

represented in a slightly different way by referring to the degree of independence of every two consecutive points in the sequence ($indep(1,2)$; $indep(2,3)$; $indep(3,4)$ . . . .). For Figure 5 a curve of the type represented in Figure 41a will result; for Figure 6 a curve similar to Figure 41b. If the points 1, 2, 3 . . . are properly chosen the heights of the peaks indicate the degree of independence of one cell from a neighboring cell (for instance, $indep(3,4) = indep(c',c'')$). This value may be called the "strength

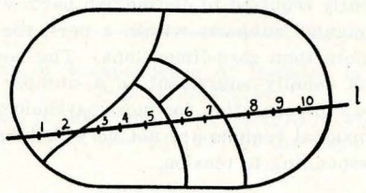


FIGURE 40.

of the boundary" $bo(c',c'')$. (The height of the peaks in Figure 41b does not need to be the same as the height of the corresponding jumps in Figure 38b).

A third and probably the most satisfactory way to indicate natural parts mathematically is the following. If within a whole the regions $a, b, \ldots$ can be distinguished in such a way that the independence of any two subregions 1, 2, within each of these regions (1^a, 2^a), is less than a value k but the independence of any subregions belonging to different regions ($1^a, 1^b, \ldots$) is larger than k ($indep(1^a, 2^a) < k$ and $indep(1^a, 1^b) > k$) the regions a, b,

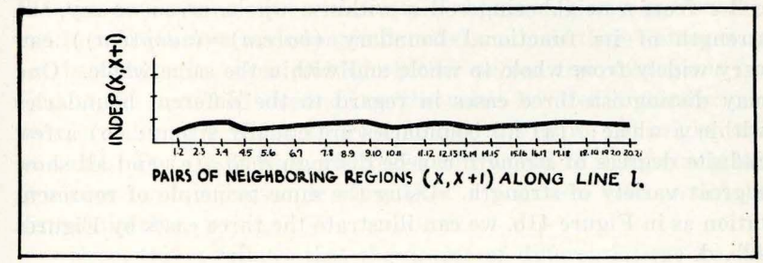


FIGURE 41a. Degree of Independence of Neighboring Regions in a Whole without Natural Subparts

The graph refers to the whole W represented in Figure 5. It indicates the degree of independence ($indep(x, x+1)$) of a region x along line l from the next region ($x+1$).

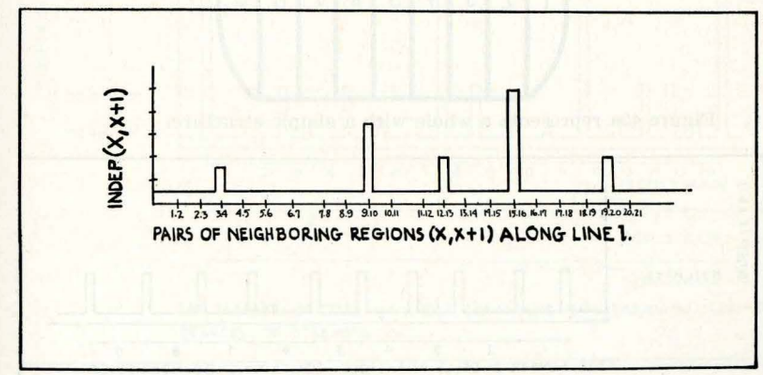


FIGURE 41b. Degree of Independence of Neighboring Regions in a Whole Containing Natural Subparts

The graph refers to the whole W represented in Figure 6. It indicates the degree of independence ($indep(x, x+1)$) of a region x along line l from the next region ($x+1$). The peaks on the curve correspond to boundaries between the natural cells (c^1, c^2, . . .) of the whole.

. . . . . are "natural parts" or "cells" (c) of the whole (W).

Definition: The degree of differentiation of the whole ($dif^k(W)$) is the maximum number of cells ($x, y, \ldots$.) into which W can be divided so that $indep(x,y) \geq k$.

The mathematical aspect of these considerations may need technical improvement. However, they suffice to characterize the relations which we have in mind and to make certain derivations possible.

The Relativity of Differentiation and the Macroscopic and Microscopic Functional Levels.—The degree of independence of a cell c from a neighboring cell n within a whole, or as we say, the strength of its functional boundary ($bo(c,n) = indep(c,n)$) can vary widely from whole to whole and within the same whole. One may distinguish three cases in regard to the different boundaries within a whole: (a) all boundaries are equally strong; (b) a few definite degrees of strength can be distinguished; (c) and all show a great variety of strength. Using the same principle of representation as in Figure 41b, we can illustrate the three cases by Figures 42b, d, e.

FIGURE 42. Degree of Differentiation of a Whole on Macroscopic and Microscopic Functional Levels

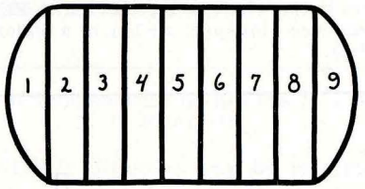


Figure 42a represents a whole with a simple structure.

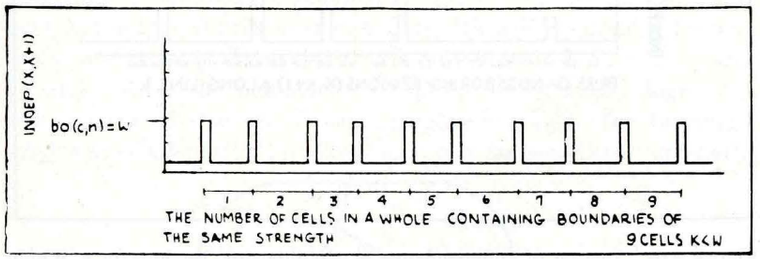


Figure 42b. Represents the degree of independence of neighboring cells of the whole shown in Figure 42a. The independence is the same for all cells.

$bo(c,n)$, the strength of the boundary between c and n. Nine cells can be distinguished relative to changes smaller than w.

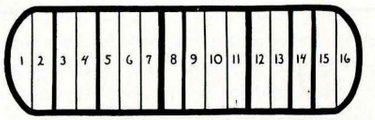


Figure 42c. A whole with a simple structure containing boundaries of three degrees of strength. The thickness of the line corresponds to the strength of the boundary.

These cases help to demonstrate the relativity of the concept of differentiation. It is characteristic for a cell that its subregions are independent to a degree less than a relatively small value k. Relative to a macroscopic view certain values of k may be "small" but in relation to a microscopic detailed analysis these values may not be small. In other words, whether or not two subregions belong to the same cell depends on the value k. For a macroscopic view, a value of k which is greater than m Figure 42d might still be small. For $s > k > m$ only three cells would be distinguishable. Whereas for a microscopic view ($k < w$) sixteen cells would be distinguishable.

From this it follows that the degree of differentiation is a de-

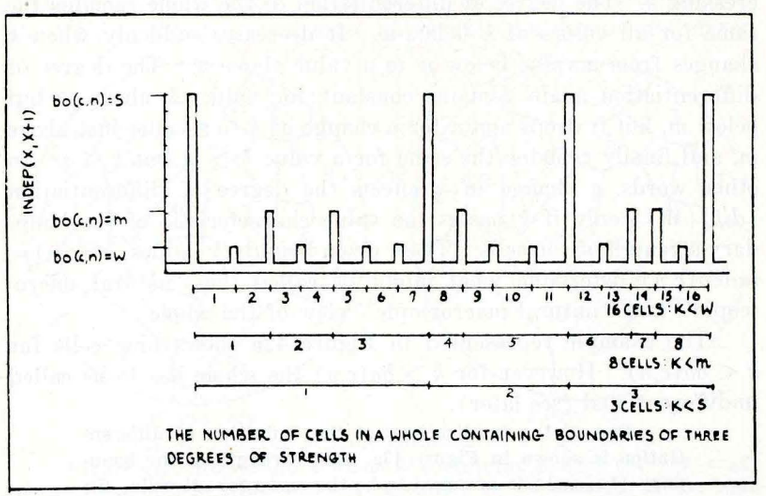


Figure 42d. The degree of independence of neighboring cells of the whole represented in Figure 42c. $bo(c,n) = w$, weak boundary corresponding to little independence; $bo(c,n) = m$, medium boundary; $bo(c,n) = s$, strong boundary. Sixteen cells can be distinguished in regard to changes in the state of a cell smaller than w, 8 cells can be distinguished in regard to changes greater than w; smaller than m; 3 cells can be distinguished in regard to changes greater than m, smaller than s.

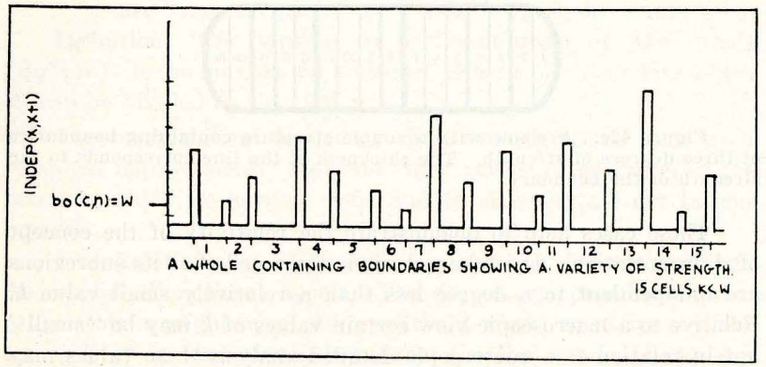


Figure 42e. The degree of independence of neighboring cells of a whole containing a variety of boundary strengths. For changes smaller than w 15 cells can be distinguished.

creasing function of k[(10) $dif^k(W) = F(1/k)$ where F means an increasing function].

This example Figure 42d shows, however, that the degree of differentiation does not necessarily decrease continuously with increasing k. The degree of differentiation of the whole remains the same for all values of k below w. It decreases suddenly when k changes from a value below w to a value above w. The degree of differentiation again remains constant for values k above w but below m, but it drops again for a change of k to a value just above m, and finally remains the same for a value $k > m$ but $k < s$. In other words, a change in k affects the degree of differentiation ($dif^k(W)$) only if k passes the value characteristic of the boundary strength of the cells. These given boundary values, $bo(c,n) = indep(c,n)$ determine what might be called the "natural microscopic" and "natural macroscopic" view of the whole.

The example represented in Figure 42a shows nine cells for $k < bo(c,n)$. However for $k > bo(c,n)$ the whole has to be called undifferentiated (see later).

One of the implications of the definition of differentiation is shown in Figure 43a. The strength of the boundary ($bo(c,n)$) is assumed to be the same for all cells. In this case $dif^k(W) = 22$ for $k < bo(c,n)$. If k increases so that $k > bo(c,n)$ the whole becomes undifferentiated according to the definition because there are no regions in W which fulfill the requirements for a cell.

It is possible, however, to find seven regions in W, whose independence $> k$, if $bo\ (c,n) < k \geq 2\ bo(c,n)$ if one refers to regions which are not neighbors. With a slightly less rigid definition of cell, one can say that $dif^k(W) = 7$. The implications of such a definition have not been explored, but it may be that this definition will eventually prove to be superior. At the present time the experimental implications of the two definitions are alike.

In Figure 42e the degree of differentiation decreases whenever k supersedes the next higher value of $bo(c,n)$; that is, the decrease is relatively continuous with increasing k.

Psychologically the person is a whole which probably has the character indicated by Figure 42d, or 42e.

These considerations may be instrumental for settling an old dispute. Many psychologists and philosophers have held that it is an entirely arbitrary matter as to how many parts may be distinguished within a whole. Other psychologists hold the opposite view. Our analysis indicates that both views are correct to a certain degree. The number of parts in a whole can be determined only in regard to a certain value k and this value can be arbitrarily defined. However, given this value, the number of cells are dependent on the strength of the boundary of the natural parts of the whole. What is even more important, the degree of differen-

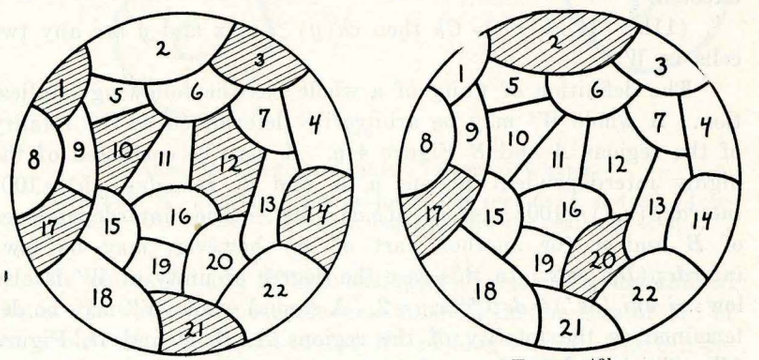


FIGURE 43a FIGURE 43b

FIGURE 43. Degree of Differentiation as a Function of k

Figure 43a. Represents a whole W containing 22 cells ($dif^k(W) = 22$), if the value of k is below that corresponding to the strength of the boundary ($bo(c,n)$) between these cells. If $k > bo(c,n)$ and at the same time $k < 2bo(c,n)$, 7 cells (1, 3, 10, 12, 14, 17, 21) can be distinguished. If k is further increased so that $2bo(c,n) < k < 3bo(c,n)$ (Figure 43b) the number of separated cells decreases to 3 (2, 17, 20); i.e., $dif^k(W) = 3$. In the first case the diameter $dia(W) = 5$, equivalent to the maximum distance between any two cells, for instance, $e_{1,22}$; in the second case $dia(W) = 2$, equivalent to $e'_{1,14}$; in the third case $dia\ (W) = 1$, equivalent to $e''_{2,20}$ (see p. 241).

tiation of the whole changes only with certain values of k. These values depend entirely on the strength of the boundaries of the cells which are not arbitrarily determined.

The Simple Unity and the Degree of Differentiation of a Whole

The Definition of the Degree of Simple Unity of a Whole and the Concept of Natural Wholes.—One can define the degree of simple unity of a whole (*si uni* (W)), that is a unity based on simple dependence as characterized above, in the following way. We are comparing the degree of dependence for every pair of regions x and y in W and define:

(11) $si\ uni\ (W) = dep^{min}(x,y)$

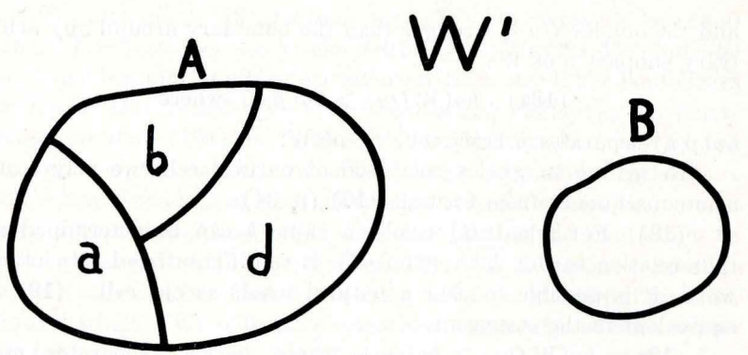
x and y are any two regions of W. From **(14)** it follows that **(11)** is equivalent to

(11a) $$si\ uni\ (W) = \frac{1}{indep^{max}(x,y)}$$

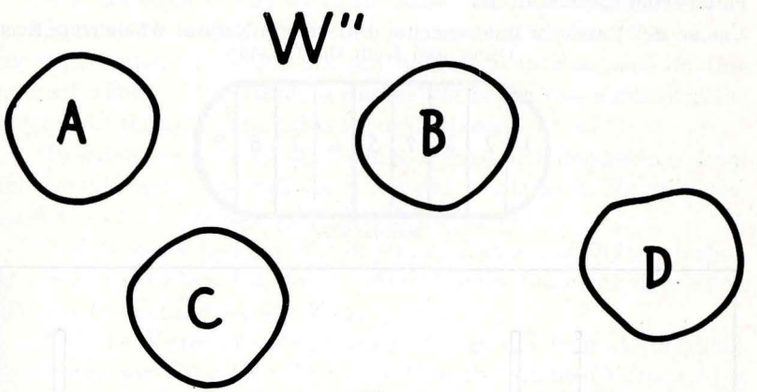
For a given whole the value of $indep^{max}(x,y)$ may be indicated by Ch. From **(11)** it follows that if any part of a whole is changed by an amount greater than Ch every part of the whole will be affected.

(11b) If $ch(x) > Ch$ then $ch(y) > \epsilon$; x and y are any two cells in W.

The definition of unity of a whole has the following implication. A whole W' may be arbitrarily determined as the totality of the regions A and B Figure 44a. A may be composed of the highly interdependent regions a, b, and d; $interdep(a,b) = 100$; $interdep(a,d) = 100$; $interdep(b,d) = 100$. The interdependence of B and a (or another part of A) however, may be low: $interdep(B,a) = 2$. In this case the degree of unity of W' is also low: $si\ uni\ (W') = dep^{min}x,y = 2$. A second whole W'' may be determined as the totality of the regions A, B, C and D, Figure 44b. The interdependence of these regions with each other may also equal 2. In this case $si\ uni\ (W'') = 2$. In other words, the degree of simple unity of W' and W' are equal. Of course, if one eliminates the region B in W' (Figure 44a), the simple unity of the rest (A) would be much higher $(si\ uni\ (A) = 100)$; whereas the elimination of the region B in W'' (Figure 44b) would leave the degree of unity of the rest (A, C, D) unchanged $(si\ uni\ (A,C,D) = 2)$.



44a



44b

FIGURE 44.. Degree of Unity. Natural Wholes.

The whole W' in Figure 44a includes the regions A and B. A includes a, b, d. The whole W'', Figure 44b, includes the region a, b, d, c.

The wholes W' and W'' are examples of arbitrarily determined wholes. It would be more adequate to speak in the case of W' of two wholes (A and B) and in case W'' of four wholes. One can define "natural wholes" in the following way.

(18) W is called a natural whole if $dep(x,y) > dep(x,z)$ where x and y refer to any two regions within W $(x \subset W; y \subset W)$ and z to any region outside W $(Z \cdot W = 0)$.

In other words, the degree of dependence between any parts within a natural whole is greater than between any part and a region outside the whole.

From this it follows that the boundary of a natural whole W,

and the outside Ou is stronger than the boundary around any arbitrary subpart p of W:

(18a) $bo(W,Ou) > bo(p,n)$ where

$bo(p,n)$ separates p from the rest of W.

Returning to wholes composed of natural cells we may state as a consequence from formula (10). (p. 34):

(19) For a natural whole, a value k can be determined so that relative to this k the whole W is undifferentiated. In other words it is possible to view a natural whole as one cell. (19) is equivalent to the statement

(19a) $bo(W,Ou) > bo(c,n)$ where $bo(c,n)$ separates any cell c from the rest of W.

FIGURE 45. Degree of Independence of Cells of a Natural Whole from Each Other and from the Outside

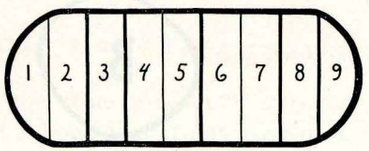


FIGURE 45a.

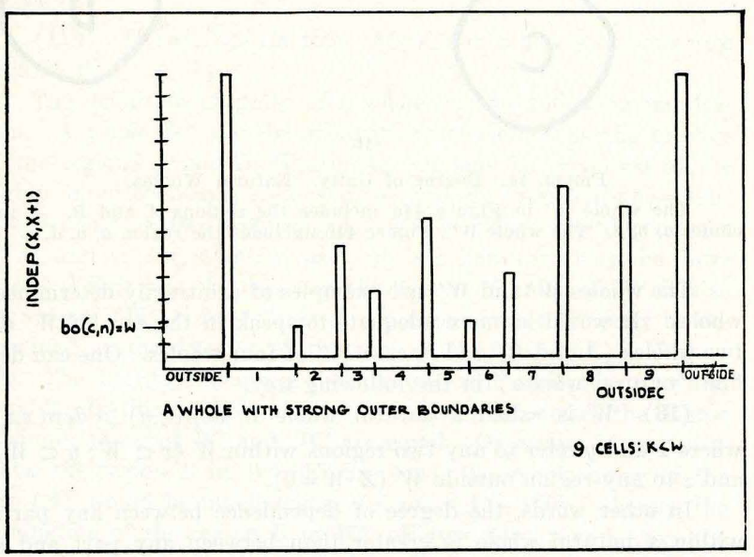


FIGURE 45b.

Figure 45a presents the structure of the whole, Figure 45b the strength of the boundary between neighboring cells.

The statement (19) follows from (18) but demands less than (18). For instance, the whole indicated in Figures 45a and 45b has outer boundaries which are stronger than any inner boundaries ($indep(W,Ou) > indep(c,n)$). Therefore, k can easily be determined so that (19a) is fulfilled. Nevertheless, the sum of the strengths of the various inner boundaries may make the cells 1 and 9 less dependent of each other than the cell 9 from the outside ($dep(1,9) < dep(9,Ou)$). In this case the whole could not be called a natural whole according to (18). [It is, however, possible to use the less demanding proposition (19a) as the definition of a natural whole. We will not discuss here the merits of such a possibility.]

The statements (18) and (19) show that the wholes indicated in Figures 42b, 42d, and 42e are not natural wholes. The example represented in Figure 42b can be said to be composed of nine natural wholes. The example Figure 42d is not one natural whole but can be thought of as three natural wholes.

In summary we may say: a high degree of independence from the outside is as essential for a natural whole as is the high dependence of the various parts within the whole.

The Relation between the Degree of Unity and Differentiation of a Whole.—Unless it is stated differently the following discussion is limited to natural wholes where:

1. The degree of independence of each cell from its neighbor (n) is the same for all cells (x) within the whole ($indep(x,n) = const.$)
2. The independence of the subregions within the same cell is practically zero.
3. The cells have the same dynamical properties; (particularly $ch(n)$ resulting from a $ch(x)$ is equal for all neighbors).
4. The dependence is based on a process of spreading (simple dependence.)

Under this condition the degree of unity of a whole depends mainly on two factors. Everything else being equal, the degree of unity is smaller, the greater the independence of neighboring cells. For if $indep(c,n)$ is greater $indep^{max}(x,y)$ is greater.

The second factor is related to the number and relative position of the cells. Figures 7a and 7b (p. 36) illustrate that two wholes W' and W'' may have the same degree of unity [$uni(W') = uni(W'') = indep(c,n+1)$ where $n+1$ refers to a cell which is separated by two boundaries (two steps) from c], in spite of a great

difference in the number of cells [$dif^k(W'') = 2\, dif^k(W'')$, for $k < bo(c,n)$].

The whole W''' (Figure 46) has the same number of cells as W' (Figure 7a) ($dif^k(W') = dif^k(W''')$). However, the degree of unity of W''' is definitely smaller than that of W' [$uni(W''') < uni\,(W') = dep(c,n+1)$]. This will be understood readily if we go back to the definition of independence of cells and unity of a whole. The degree of independence of c from neighbor n ($indep(c,n)$) was defined as the maximum change of n ($ch^{max}(n)$) which would change c less than a small amount ϵ. In case of natural cells we called this amount of change $bo(c,n)$. If the state of the cell 1 in Figure 46 was changed to this degree, this would not affect the state of the cell 3. For to affect the state of 3, the state of cell 2 would have to be changed at least to the amount $ch^{max}(n) = indep\ (3,2) = bo(c,n)$. Whether a change of cell 1 to the amount 2 $bo(c,n)$ would suffice to affect cell 3 cannot be stated. However we can say that the change of cell 1 must be large enough to induce in cell 2 a change equal to or greater than *indep* (3,2) before cell 3 will be affected and this change of cell 1 will be

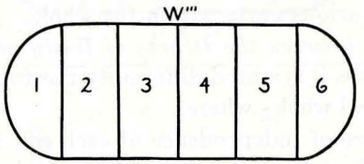


FIGURE 46. Differentiation, Structure and Unity of a Whole

The whole W''' has the same degree of differentiation as the whole W' represented in Figure 7a; $dif^k(W''') = dif^k(W') = 6$. However, W' has a higher degree of unity because $e^{max}_{x,y} = 1$ for W', $e^{max}_{x,y} = 5$ *for* W'''.

$indep(3,1) > bo(c,n)$. A still greater change of 1 is required to affect the cells 4, 5, or 6. In other words the dependence of a cell of W''' from cell 1 ($dep(1,y)$) is smaller as more cells lie between 1 and y. As the degree of unity of a whole is the degree of dependence of the least dependent cells, it follows that $uni\,(W''') = dep\,(1,6) < dep(1,3) = uni\,(W')$.

This consideration may suffice to demonstrate that under the conditions mentioned above (p. 239), the degree of dependence of any two cells x and y of a whole depends upon the minimum number of boundaries crossed by a path from one of these cells to the other. This is equivalent to what in "hodological space" is called, the "distance" ($e_{x,y}$) between x and y. (See (53)). (For example,

in Figure 43a the distance of the cell 1 and 3 equals 2, ($e_{1,3} = 2$); $e_{1,22} = 5$; $e_{9,14} = 5$.) In other words, $indep(x,y = F(e_{x,y}))$ where F means a monotonous increasing function.

We will call $e^{max}_{x,y}$ the "diameter" of $W < (dia(W))$.

(20) $dia(W) = e^{max}_{x,y}$; where $x \subset W$ and $y \subset W$

From **(11a)** it follows that $si\ uni(W) = F(1/dia\ (W))$ for a given value of $indep\ (c,n)$.

If we take both the number and position of cells in the whole and the strength of the boundaries of the cells into account we can say that the degree of unity of the whole increases with the dependence of neighboring cells and decreases with its diameter.

$$\textbf{(12)} \quad si\ uni\ (W) = F\left(\frac{1}{bo(c,n),\ e^{max}_{x,y}}\right) = F\left(\frac{dep(c,n)}{dia\ (W)}\right)$$

This formula indicates that the unity of a whole does not depend

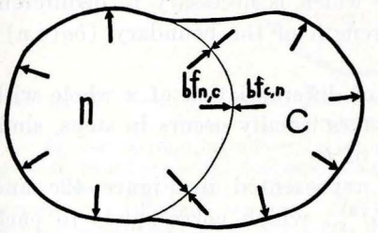


FIGURE 47a

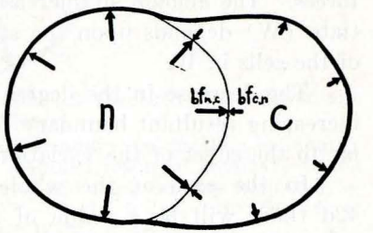


FIGURE 47b

FIGURE 47. Boundary Forces and Resultant Boundary Forces

n, c, neighboring cells of the whole; $bf_{n,c}$ and $bf_{c,n}$, forces acting on the boundary between c and n in the direction toward c or toward n respectively. In Figure 47a, the opposing boundary forces are equal in strength, in Figure 47b they differ.

directly on its degree of differentiation but on its "structure" (number and position of cells).

Boundary Forces, Differentiation and Unity of a Whole.—The degree of independence of cells has been defined in terms of a certain amount of change. If this change is a change of tension (and probably also if we have to do with any other kind of change) the degree of independence can be correlated to the strength of forces on the boundary of one cell which will not affect the state of another cell. More precisely, let us assume that there is a state of equilibrium, i.e., the forces at the boundary of neighboring cells $bf_{c,n}$ and $bf_{n,c}$ are equal and opposite (Figure 47a). A decrease in the forces $bf_{c,n}$ (Figure 47b) will affect the state of c as soon as

the difference $|bf_{n,c}|-|bf_{c,n}|$ which we may call the resultant boundary force $bf^*_{n,c}$ reaches a certain value. This value of $bf^*_{n,c}$ will be the greater the greater the independence of these cells ($indep(c,n)$). The definition of independence of neighboring cells may therefore be expressed by[31]

(13a) $indep(c,n) = bf^{*max}_{n,c}$ for which $ch(c) < \epsilon$

The present strength of the resultant boundary force may be indicated by bf^*. It is obvious that certain values of bf^* in formula 13a are equivalent to certain values of k in formula (17). It follows therefore from (10) that:

(10a) $$dif^{bf*}(W) = F\left(\frac{1}{bf^*}\right)$$

That is, cells which are independent in regard to weak boundary forces are not necessarily independent relative to strong forces. The amount of increase which is necessary to dedifferentiate (W) depends upon the strength of the boundary ($bo(c,n)$) of the cells in W.

The decrease in the degree of differentiation of a whole with increasing resultant boundary forces usually occurs in steps, similar to the effect of the variation of k.

In the case of the whole represented in Figure 42c and 42d there will be a value of $bf^*_{n,c}$ which corresponds to each value of $indep(n,c)$. Let us assume that $indep(n,c) = w$ corresponds to a value of $bf^*_{n,c} = w'$, that $indep(n,c) = m$ corresponds to $bf^*_{n,c} = m'$ and that $indep(n,c) = s$ corresponds to $bf^*_{n,c} = s'$. Then $dif^{bf*}(W) = 16$ if $bf^*_{n,c} < w'$. If $w' < bf^*_{n,c} < m'$ then $dif^{bf*}(W) = 8$ and finally if $m' < bf^*_{n,c} < s'$ then $dif^{bf*}(W) = 3$.

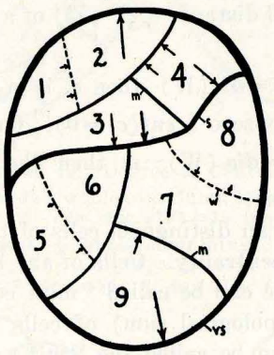
Another example is shown in Figure 48. The structure here is more complicated but the treatment of the problem is essentially the same with respect to $bf^* > s$ but $< vs$, $dif^{bf*}(W) = 1$.

In the case of Figure 43a which has already been discussed, (p. 235) the use of boundary forces would not affect the discussion.

These examples may suffice to illustrate the following point. Suppose it is necessary, for some reason or other, to keep parts within a whole, e.g., an organism independent of each other. The

[31] In physics the value for $bf^{*max}_{n,c}$ is frequently independent of the absolute tension level. We cannot assume this to hold always. We refer therefore to a certain beginning level of $bf^*_{n,c}$.

number of such independent parts depends on the difference in tension (the strength of the resultant boundary forces) relative to which the cells should be independent and the position of the regions in tension. How the degree of differentiation of a given whole decreases with increasing forces depends on the strength and the position of the boundaries of the natural cells within the whole. However, it is always possible to determine a strength of a



FIGUURE 48. Degree of Differentiation and the Strength of the Resultant Boundary Forces

bs, very strong boundary; *s*, strong boundary; *m*, medium boundary; *w*, weak boundary. The corresponding maximal resultant boundary forces which would not affect the state of the neighboring cell are indicated by arrows of different lengths. $dif^k(W) = 9$ if $k < w$; $dif^k(W) = 6$ if $w < k < m$; $dif^k(W) = 2$ if $m < k < s$; $dif^k(W) = 1$ if $s < k < vs$.

resultant boundary force relative to which a natural whole is to be regarded as undifferentiated, and a certain strength relative to which the whole cannot be treated as a natural whole.[32]

The implications of these considerations become clearer when we discuss the relation between variability and differentiation (p. 249).

Stratification of a Whole

We will limit our discussion to natural wholes where all boundaries have the same strength.

[32] We cannot say that the degree of unity ($uni(W)$) is a function of these forces. It is correct that the diameter $dia(W)$ changes with bf^* or k. However it seems to hold that $uni(W) = F\left(\frac{dep(c,n)}{dia(W)}\right) = const$ for a given natural W whatever the value of bf^* or k, relative to which the cell within W is defined.

It is possible to distinguish certain groups of cells within a whole on the basis of their functional similarities. These more inclusive subparts of the whole can be called "layers." The "degree of stratification of a whole" (*stra*(*W*)) can be defined as the number of its layers.

Central and Peripheral Regions.—We can distinguish cells of different "degrees of centrality" (*cent*(*c*)) by considering the maximum hodological distance $e_{c,y}^{max}$ (53) of a cell *c* from any other cell *y* in a whole *W*.

(21a) If $e_{c,y}^{max} = dia(W)$ then *c* is a peripheral cell. Its degree of centrality is zero ($cent(c) = 0$). Or more generally:

(21) If $e_{c,y}^{max} = dia\,(W) - m$ then the degree of centrality of *c* is *m* ($cent(c) = m$).

In this way we can distinguish cells of the first, second, third . . . . degree of centrality. Cells of the highest degree of centrality within a whole can be called "most central" cells.

The totality (topological sum) of cells for which the degree of centrality is *m* can be called the "m^{th} central layer" (*m cen lay*).

(22) m^{th} *cen lay* = totality of cell for which $cent(c) = m$. The layer containing the cells $cent(c) = 0$ is called the peripheral layer.

The degree of "centrality stratification" of a whole (*cen stra* (*W*)) is one greater than the highest degree of centrality of any one of its cells. This definition makes the degree of centrality stratification equal to the number of strata.

(23) $cen\ stra\ (W) = (cent^{max}(c) + 1)$

One may raise the question of the relation between the diameter of a whole and the highest degree of centrality of its cells? Is a central layer always a connected region? etc. We cannot attempt a detailed discussion of these questions here. However a few examples may be welcomed as illustrations.

Figure 49a represents a whole containing twelve cells, which are all peripheral. The degree of centrality stratification is one. The same holds true for the whole represented in Figure 49b. Cell 1 and cell 2 are peripheral in spite of the fact that cell 1 is surrounded by cell 2.

Figure 50a represents a whole containing nineteen cells. *Cen stra*(*W*) = 3. The most central layer contains but two cells, namely

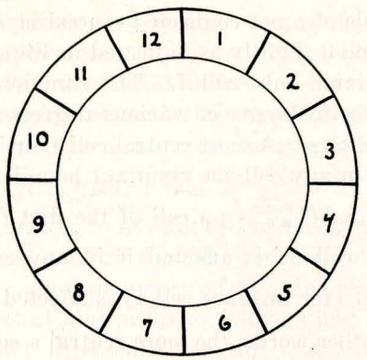


FIGURE 49a

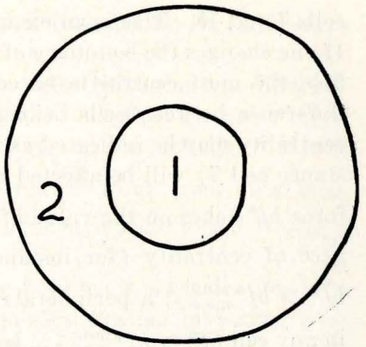


FIGURE 49b

FIGURE 49. Degree of Centrality

Figure 49a represents a whole containing 12 peripheral cells; $dif(W) = 12$; $cent\ (x) = const = 0$; $cen\ stra\ (W) = 1$; $inn\ stra\ (W) = 1$.

Figure 49b represents a whole containing 2 peripheral cells, one of them being an inner cell; $dif(W) = 2$; $cent\ (1) = cent\ (2) = 0$; $cen\ stra\ (W) = 1$; $inn\ (1) = 1$; $inn\ (2) = 2$; $inn\ stra\ (W) = 2$.

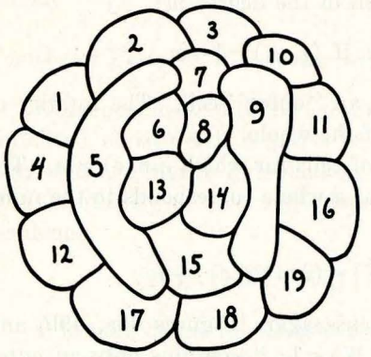


FIGURE 50a

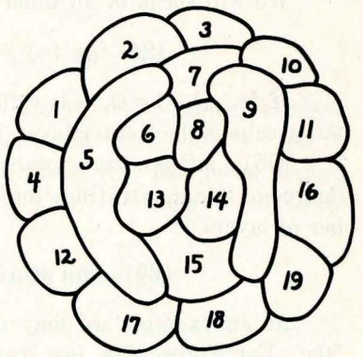


FIGURE 50b

FIGURE 50a. Stratified Whole

$dif(W) = 19$; $dia(W) = e_{x,y}^{max} = 4$; $cen\ stra\ (W) = 3$; $inn\ stra\ (W) = 3$.

The peripheral layer ($e_{c,y}^{max} = 4$) contains the cells 1, 4, 10, 11, 12, 16, 19; the first central layer ($e_{c,y}^{max} = 3$) contains the cells 2, 3, 5, 6, 8, 9, 13, 14, 17, 18; the second central layer ($e_{c,y}^{max} = 2$) contains the cells 7, 15. The outer layer ($e_{c,Out} = 1$) contains the cells 1, 2, 3, 4, 10, 11, 12, 16, 17, 18, 19; the first inner layer ($e_{c,Out} = 2$) contains the cells 5, 7, 9, 15; the second inner layer ($e_{c,Out} = 3$) contains the cells 6, 8, 13, 14.

FIGURE 50b. The Effect of the Change of One Cell upon the Position of Other Cells of a Whole

The change of the boundary between cell 3 and cell 7 eliminates cell 15 from the most central layer which contains now only cell 7.

cells 7 and 15. This is an example of a not connected central layer. If one changes the boundary of cell 3 slightly as indicated in Figure 50b, the most central layer contains only cell 7. The functional difference between cells belonging to layers of various degrees of centrality may be indicated as follows: A most central cell (for instance cell 7) will be affected if in any cell the resultant boundary force bf^* takes on the value $bf^* > bf^{*\,max}_{n,c+1}$; a cell of the first degree of centrality (for instance cell 2) is affected if in any cell $bf^* > bf^{*\,max}_{n,c+2}$; a peripheral cell (for instance cell 4) is affected if in any cell $bf^* > bf^{*\,max}_{n,c+3}$. In other words, the more central a cell, the easier it is affected by changes within the whole; and the more easily a change in this cell affects all other cells of the whole.

Inner and Outer Layer.—We define inner and outer layers by considering the hodological distance $e_{c,Ou}$ of a cell c from the region (Ou) outside the whole.

We will speak of an inner cell of the degree m:

(24) $inn\ (c) = m$, if $(e_{c,Ou}) - 1 = m$.

If $(e_{c,Ou}) - 1 = O$, c is called an "outer" cell. The totality of outer cells is the "outer layer" of the whole.

(25) $m^{th}\ inn\ lay$ = totality of cells for which $inn(c) = m$. The degree of "inner stratification" of a whole corresponds to the number of layers.

(26) $inn\ stra(W) = (inn^{max}(c)) + 1$

As an example we may discuss again Figures 49a, 49b, and 50a. For Figure 49a, $inn\ stra\ (W) = 1$; it contains only an outer layer. The whole represented in Figure 49b contains an outer and a first inner layer: $inn\ stra\ (W) = 2$, although $cen\ stra\ (W) = 1$ as we have seen above.

The whole represented in Figure 50a shows the same number of central as of inner layers: $inn\ stra(W) = cen\ stra\ (W) = 3$. However the three layers are composed of very different cells in the two kinds of stratification. For instance $cent$ (cell 7) = 2, inn (cell 7) = 1; $cent$ (cell 2) = 1, inn (cell 2) = 0. The change of cell 3 from Figure 50a to Figure 50b changes the number of cells belonging to the most central layer. However it does not change the

"belongingness" of any cell to the outer or inner layers of the various degrees.

The functional difference between cells belonging to different inner layers can be illustrated as follows: A cell of the outer layer is affected as soon as the resultant force on the boundary of the whole is greater than $bf^{*\,max}_{Ou,W}$. A stronger force from outside is necessary to affect a cell of the first inner layer, and a still stronger force to affect the most inner layer.

As a summary of the difference between a stratification into central and peripheral layers and the stratification into inner and outer layers one can say that the degree of centrality of a cell determines how easily the cell will be affected by changes anywhere inside the whole and how easily a change in this cell will affect the rest of the whole. The position of a cell in a certain inner layer determines how easily a cell will be affected by changes outside the whole and how easily a change in this cell will affect the outside.

Variety of Patterns Which can be Realized in a Whole

Homogeneity and Heterogeneity of a Whole.—The actual state (quality) of two cells a and b can be equal $(s(a) = s(b))$ even if both cells are highly independent. However the maximum degree of dissimilarity of two cells depends upon their degree of independence.

(27) $|\, s(a) - s(b)\,|^{max} = F(indep(a,b))$

One may define inhomogeneity of a whole $(inhom(W))$ as the greatest difference of the state of any cells within W [other definitions would be possible].

(28) $inhom(W) = |\, s(x) - s(y)\,|^{max}$ at a given time.

That implies that $inhom(W) = 0$ if all cells are in the same state. Homogeneity can be defined:

(29) $$hom(W) = \frac{1}{inhom(W)}$$

A whole which is highly differentiated and stratified may still be fully homogeneous. In other words, it holds true for any kind

of whole that $inhom(W)^{min}=0$. The maximum inhomogeneity of different wholes, however, can be different.

We limit the discussion again to a natural whole with a constant degree of independence of neighboring cells within the whole, and to a certain absolute range of states.

From (**28**) and (**27**) as follows

$$(30)\quad inhom^{max}(W)=F(indep^{max}(x,y))$$

From (**30**) together with (**11a**) and (**12**) follows

$$(30a)\quad inhom^{max}(W)=F\left(\frac{1}{si\ uni(W)}\right)=F(dia(W),bo(c,n))$$

In other words the maximum inhomogeneity of a whole is a function of its diameter and the strength of the inner boundaries. It is an inverse function of the degree of unity of the whole.

The Variety of Patterns.—A whole A may contain three cells (a,b,d) as indicated in Figure 44a; the maximum difference between the states of two neighboring cells may be g. If the state of one cell equals u $(s(a)=u)$ the state of the other cells can also equal u $(s(b)=u;\ s(d)=u)$; or one or both of these two cells may have any state between u and $u\pm g$ $(u-g\leq s(b)\leq u+g;\ u-g\leq s(d)\leq u+g)$. The number of different constellations of states of the various cells which can be realized within a whole may be called the variety of pattern $(var(W))$ in W.

The variety of pattern depends upon the maximum difference of any two cells within a whole, i.e., the maximum degree of inhomogeneity (**30**). According to (**30a**) this depends on the diameter and the strength of the inner boundaries of the whole $(var(W)=F(inhom^{max}(W))=F(dia(W),\ bo(c,n))$. However, given the same strength of the inner boundaries and the same diameter and degree of stratification, the variety may still be different if the degree of differentiation is not the same. For instance, for the wholes A and B represented in Figure 51 it holds: $dia(A)=dia(B)=2$; $cen\ stra(A)=cen\ stra(B)=2$; $inn\ stra(A)=inn\ stra(B)=2$, $bo(c,n)^A=bo(c,n)^B$. To simplify the discussion we may allow only two states of a cell, indicated by S_1 and S_2. A glance at the variation (1), (2) and (3) shown in Figure 51 makes it clear that $var(B)>var(A)$ in spite of the equality of the factors mentioned. This means that the degree of differentiation is an important factor for the variety of possible patterns.

$$(31)\quad var(W)=F(dia(W),\ dif^k(W),\ bo(c,n)),\ \text{where}\ k<bo(c,n)$$

The Variety of Pattern of an Organic Whole and the Effect of

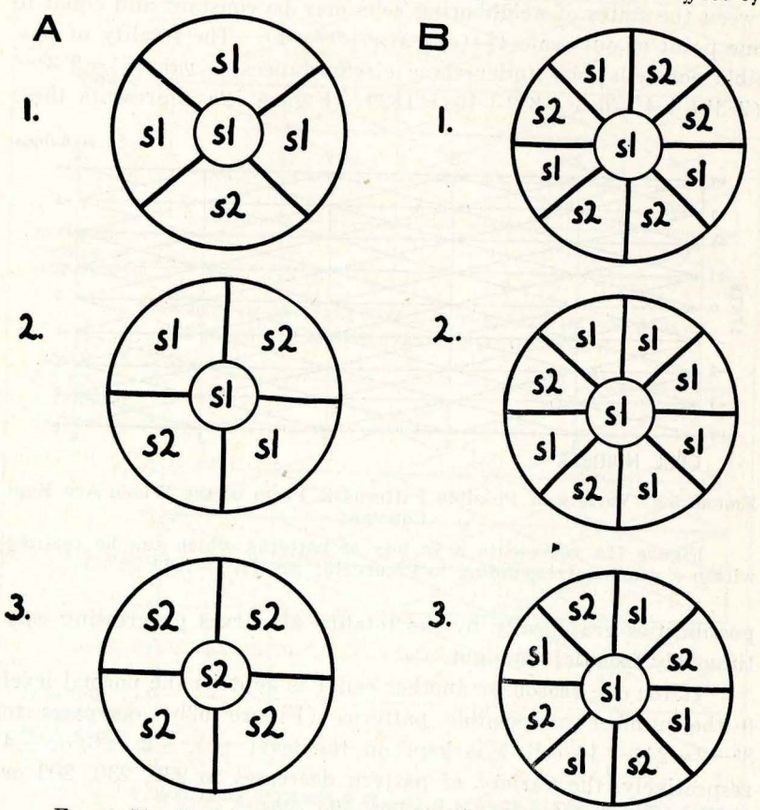


FIGURE 51. Variety of Patterns and Degree of Differentiation

Keeping Certain Parts Constant.—It is possible to treat the problem of the variety of patterns in a somewhat more concrete way, if we take into consideration that the degree of change within an organism is definitely limited. If this state deviates too much from the normal state the living cell will die.

Using a scale of nine points we can indicate by $+4$ and -4

the upper and lower maxima, by 0 the normal state. To simplify the discussion we will not consider continuous changes but only states corresponding to the nine points of the scale.

Let us discuss the variety of possible patterns within a simple whole corresponding to Figure 46. The maximum difference between the states of neighboring cells may be constant and equal to one point of our scale ($|s(c)-s(n)|^{max}=1$). The totality of possible constellations under these circumstances is $var(W)=9\cdot3^5-(2\cdot3^4+4\cdot4^3+6\cdot3^2+8\cdot3+10)=1829$. Figure 52a represents these

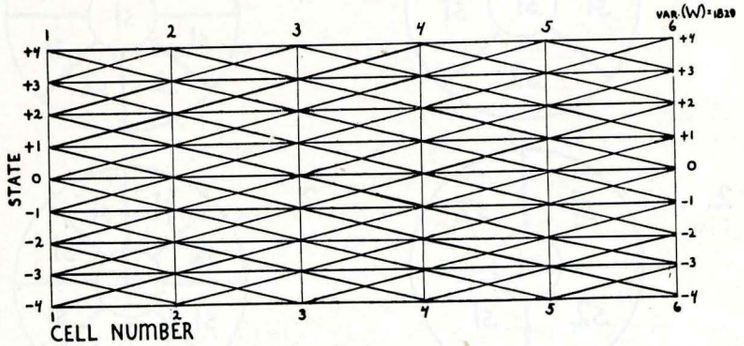


FIGURE 52. Variety of Possible Patterns if Parts of the Whole Are Kept Constant

Figure 52a represents a variety of patterns which can be realized within a whole corresponding to Figure 46; *var* $(W)=1829$.

possibilities graphically by the totality of curves progressing continuously from left to right.

If for one reason or another cell 1 is kept on the normal level 0 the number of possible patterns (Figure 52b) decreases to $3^5-2=241$. If cell 1 is kept on the level ±1, ±2, ±3, or ±4 respectively, the variety of pattern decreases to 239, 230, 203 or 122[33] respectively (see Figures 52c, 52d, 52e).

In other words, the more the state of the cell which is kept on a constant level deviates from normal (o) the smaller is the variety

[33] The general formula for a whole with this simple structure, in case cell 1 is kept constant is: $var=3^{n-1}-(3^{n+a-l-2}+3^{1+a-l-3}+,\ .\ .\ .\ +3^{\circ})-(3^{n-a-l-2}+3^{n-a-l-3}+\ .\ .\ .\ +3^{\circ})$, where n=number of cells, $\pm a$=difference of the state of cell 1 from "normal," and l = the greatest possible difference of the state of a cell from normal.

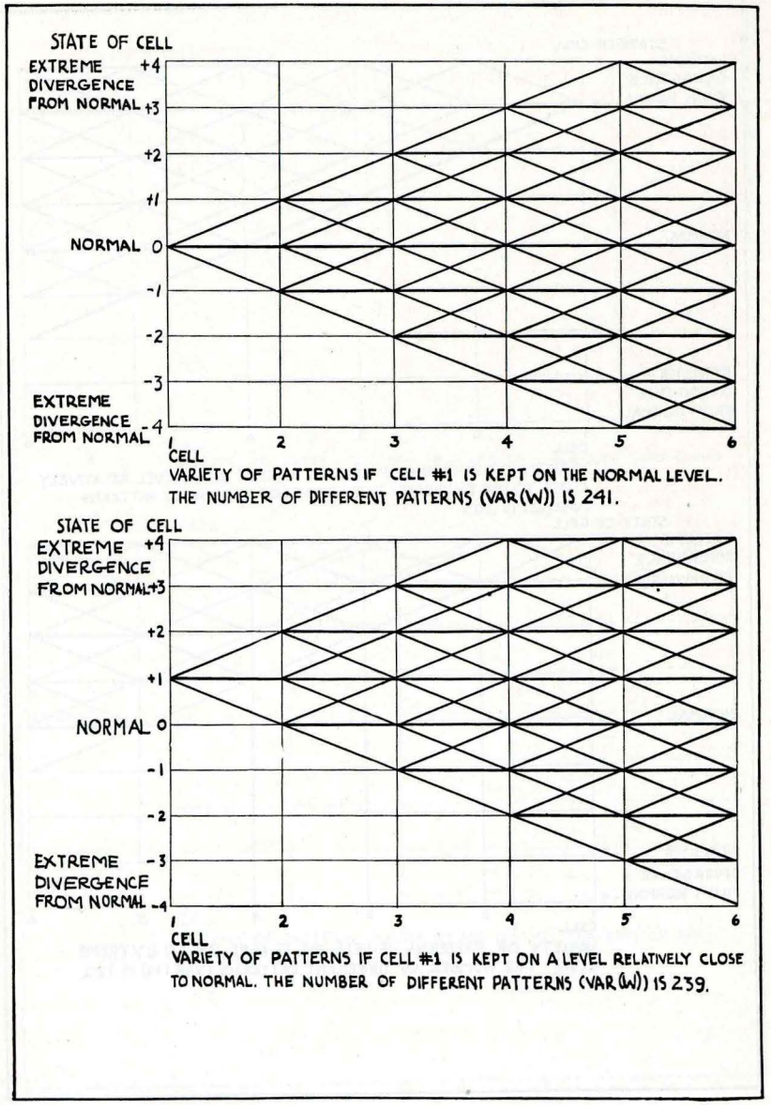


Figure 52b. If cell 1 is kept on the normal level, the variety of patterns decreases to 241.

Figure 52c. If cell 1 is kept on level 1, *var* $(W)=239$.

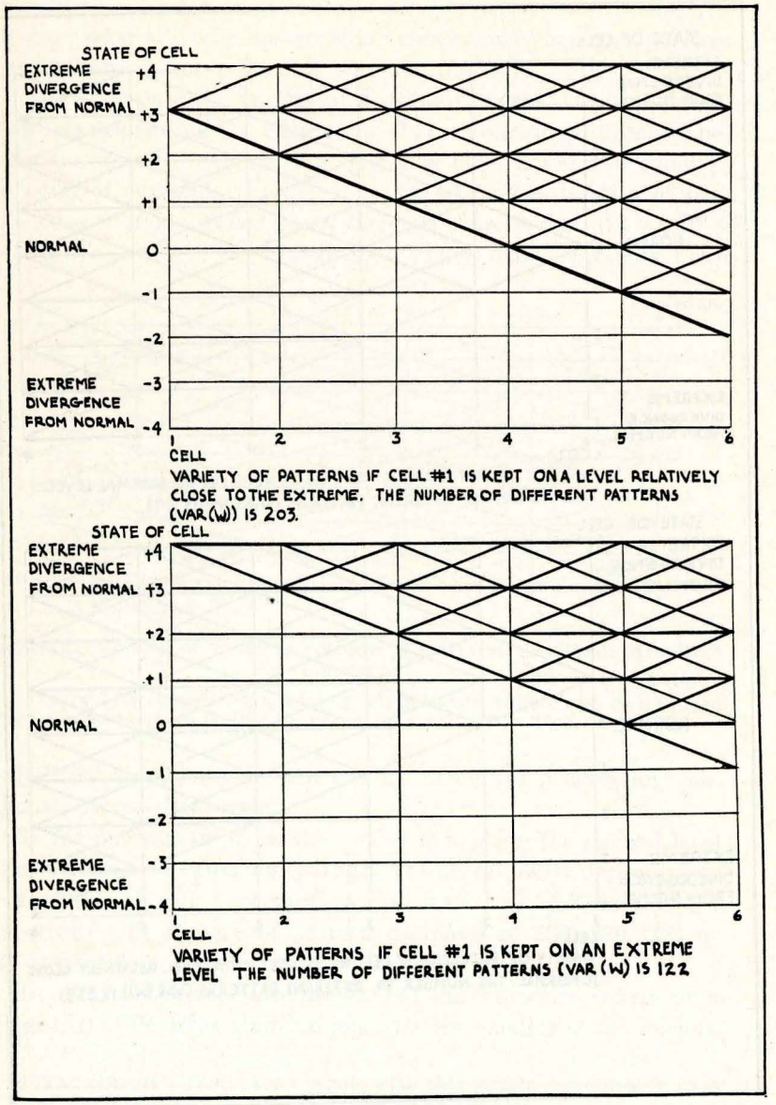


Figure 52d. If cell 1 is kept on level 3, *var* $(W) = 203$.

Figure 52e. If cell 1 is kept on level 4, *var* $(W) = 122$.

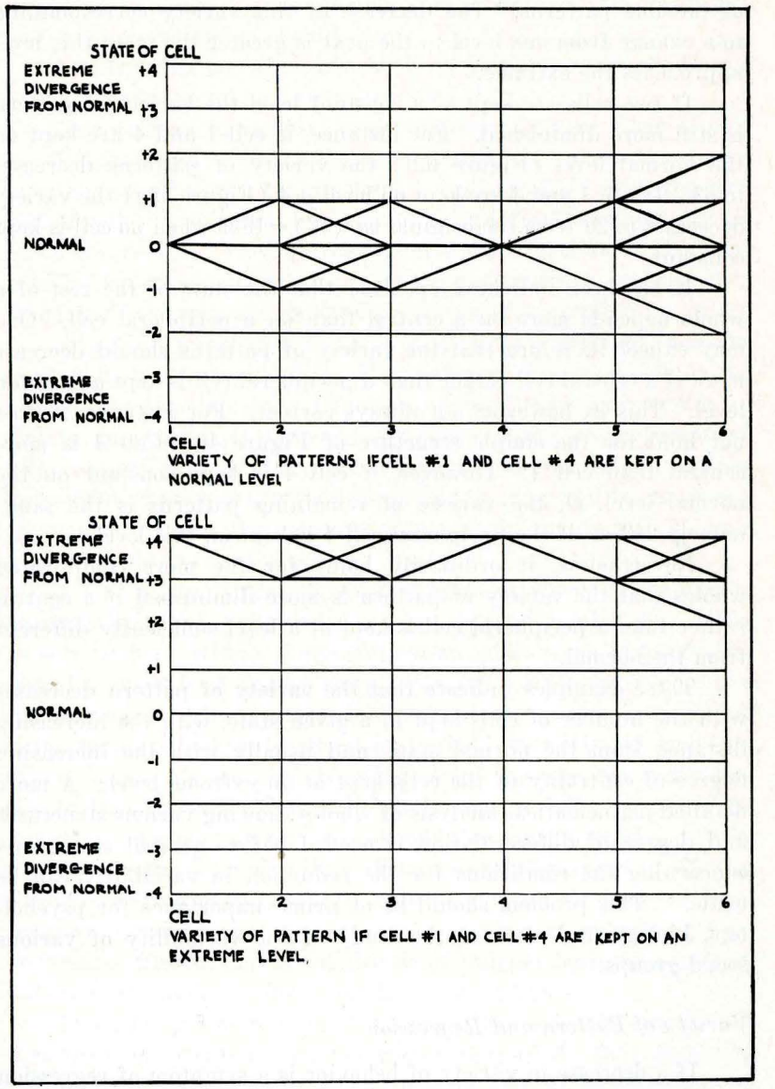


Figure 52f. If cell 1 and cell 4 are kept on the normal level, *var* $(W) = 63$.

Figure 52g. If cell 1 and cell 4 are kept on level 4, *var* $(W) = 20$.

of possible patterns. The decrease of this variety corresponding to a change from one level to the next is greater the more this level approaches the extreme.

If two cells are kept at a constant level the variety of pattern is still more diminished. For instance, if cell 1 and 4 are kept on the normal level (Figure 52f) the variety of patterns decreases to 63. If cell 1 and 4 are kept on level ± 4 (Figure 52g) the variety decreases to 20 from the original $var(W) = 1829$ when no cell is kept constant.

It has been indicated (p. 246) that the state of the rest of a whole depends more on a central than on a peripheral cell. One may expect therefore that the variety of patterns should decrease more if a central cell rather than a peripheral cell is kept at a given level. This is, however, not always correct. For instance, it does not hold for the simple structure of Figure 46. Cell 4 is more central than cell 1. However, if cell 4 is kept constant on the normal level, O, the variety of remaining patterns is the same, namely 243, as if the peripheral cell 1 is kept on this level.

Nevertheless, it ordinarily holds for the more complicated wholes that the variety of pattern is more diminished if a central rather than a peripheral cell is kept at a level sufficiently different from the normal.

These examples indicate that the variety of pattern decreases with the number of cells kept in a given state, with the increasing distance from the normal state, and usually with the increasing degree of centrality of the cells kept at an extreme level. A more detailed mathematical analysis of wholes showing various structures and degree of differentiation is needed before general statements concerning the conditions for the reduction in variability can be made.[34] This problem should be of prime importance for psychology, biology and also for the study of the variability of various social groups.

Variety of Pattern and Regression

If a decrease in variety of behavior is a symptom of regression and if the variety of behavior presupposes a variety of pattern

[34] A more detailed discussion of these problems is forthcoming by A. L. Baldwin.

realizable in a whole, it is possible now to state certain conditions under which regression should occur.

1. Any fixation of a sufficiently large part of the whole to a constant state should lead to regression.

This decrease of variety should, however, be very slight if only one peripheral cell is held on a normal level. If the whole referred to in Figure 46 would contain twenty instead of six cells, the fixation of cell 1 to a normal level would be practically without significance for $var(W''')$. The regression should be greater the more cells are kept constant, the more central the cells are, and the more the state of the cells are removed from that of normality.

Situations where certain parts of the person are kept in a constant state occur frequently. For instance, a need which is not satisfied corresponds to a relatively constant state of tension of certain innerpersonal systems. Pressure from the environment may keep the individual or part of him in a certain state of tension. Certain manipulations, which the person is supposed to carry out, frequently require that certain parts of the individual be kept within a definite range of states.

All or at least most of the situations in which the person is awake require that the state of a more or less extended part of the person be kept within a limited range. (In some respects this probably holds least during sleep. See 22). However, such situations cannot be called "regression" because the person actually has never shown a higher developmental state. However, if such outside requirements are very extended, if for instance, the individual is kept busy day after day with certain routine tasks which occupy a considerable part of him [i.e., keeps that part within a definite state or sequence] he may show certain signs of regression. Nevertheless, this regression will be relatively small as long as these occupied areas are not too extensive, as long as only peripheral layers are affected, and if the degree of independence of neighboring cells (strength of inner boundaries) is sufficient.

This conclusion from our formulae is surprisingly well in line with the experiments on psychological satiation (37, 45). Satiation may occur in a situation in which the same activity is repeated over and over again, that is where certain areas of the person are kept in a more or less constant state. The outstanding symptoms of oversatiation may well be called typical cases of regression. For

instance, the larger units dedifferentiate into smaller and smaller parts (37). The experiments show that if the activity is kept sufficiently peripheral no satiation may occur. Both agreeable and disagreeable activities are more rapidly satiated than neutral ones. Indeed, in both cases, more central areas are touched and therefore larger areas of the person are kept in a fixed state. Anything else which increases centrality seems to speed up satiation. The velocity of satiation is greater in children; indeed they are less differentiated and the cells are less independent. Feeble-minded persons who show greater independence of neighboring cells (measured by co-satiation and other symptoms) show a slower satiation than younger children of the same degree of differentiation (45).

From our previous discussions we would expect that an increase in emotional tension should lead to marked regression when the tension has reached a certain level. This is the theory advanced in a previous investigation by Dembo (12, 116-120) a theory which is well in line with the experiments and the results of the present study.

2. We should expect regression if the strength of the boundary decreases. An example may be fatigue, which, according to Zeigarnik (84) corresponds to a more fluid state in which the person is unable to build or to preserve systems in tension. (A similar inability to keep tension has been observed in schizophrenic patients if peripheral activities are carried through (70)).

Of course in all of these cases other factors play a role in addition to the variety of patterns.

3. It should be noticed that the limitation of variation of patterns is based on two rather distinct groups of factors. One group has to do with the degree of differentiation, the diameter of the whole, and the strength of the boundaries of the cells. The second group deals with the scope of states which a cell may have without dying.

Both factors should be clearly distinguished particularly in view of certain developmental trends. In regard to the first factor (differentiation, boundary strength, etc.) adults show definitely greater variability than the child. In regard to the second factor, however, indications point to the fact that the cells of the young organism can differ more widely from the normal state without being destroyed and that the younger person therefore shows

greater variability. Our examples indicate that a greater tolerance for deviations from the normal would have to be very outstanding (much greater than it actually seems to be) if it should counteract the increase in the variety of pattern resulting from the greater differentiation of the more mature person, its stratification and the greater strength of the boundaries of his cells.

Organizational Dependence and Organizational Unity of a Whole

We will limit the discussion of organizational dependence and unity to a few general considerations.

Organizational Dependence

It does not seem to be possible to define the degree of "organizational dependence" or independence of two regions a and b in the same way as "simple dependence" (p. 32), namely, by referring to the amount of change which is necessary in one region to change the other region. For organizational dependence the important characteristic of a is its power to induce a change of state in b and this power seems to have no direct relation to the amount of change in a necessary to influence b. One can define the organizational dependence of a upon b ($org\ dep\ (a,b)$) as the maximum change which can be induced by b in a ($i^b ch(a)^{max}$)

$$\textbf{(32)} \quad org\ dep\ (a,b) = i^b ch(a)^{max}$$

The difference between (32) and (13) expresses a difference between simple and organizational dependence. For the former, but not for the latter, there is a tendency for the states of dependent regions to be equal.

We have mentioned that a similar type of dependence exists in social psychology (p. 32). If we refer to induced forces rather than to induced changes, we might define power of b over a ($pow\ b/a$) as the quotient of the maximum force which b can induce on a ($i^b f^{max}_{a,x}$), and the maximum resistance ($f^{max}_{\overline{a,x}}$) which a can offer. (x indicates the region into which a should locomote according to the will of b; $f_{\overline{a,x}}$ indicates a force in the direction opposite to $f_{a,x}$ (53)).

$$(33) \quad \text{power } (b/a) = \frac{i^b f^{max}_{a,x}}{f^{max}_{a,x}}.$$

If one makes the reasonable assumption that there is a close relation between induced forces and induced changes (**32**) and (**33**) are probably equivalent.

Head and Tool

Referring to dynamic wholes, we will call a leading region a "head" (*h*), and the led region a "tool" (*to*). We can define head and tool by the following formula

$$(34) \quad pow\ (h/to) > pow\ (to/h)$$

The greater the value, *pow* (*h/to*), the easier it is for the head to induce such changes of the tool as desired. Let us consider, for instance, a tool containing many subregions. The ease with which the position of the subregions to each other can be changed, depends upon the strength of the forces induced by the head in comparison to the strength of the restraining forces acting on the tool opposite to the induced forces.

Organizational Unity

It seems possible to define the organizational unity of a whole (*org uni* (*W*)) in the following way:

$$(35) \quad org\ uni(W) = pow(hh/W-hh)$$

In other words, the organizational unity of a whole is related to the power of the strongest head (*hh*) over the rest of the whole (*W-hh*). It may be that other factors should be added. However, formula (35) may well serve as a first approximation.

If the whole is composed of cells all of which have the same power, the organizational unity of the whole is small because the power of any one cell *c* relative to the rest of the whole (power *c/W-c*) is small.

A simple case of high organizational unity is given if we have to deal with a whole containing *one* strong head, the rest having but little power (Figure 53a). If the tool regions are very numerous the effective power of the head may be greater if a number of subleaders (subheads, *sh*) (Figure 53b) can be employed.

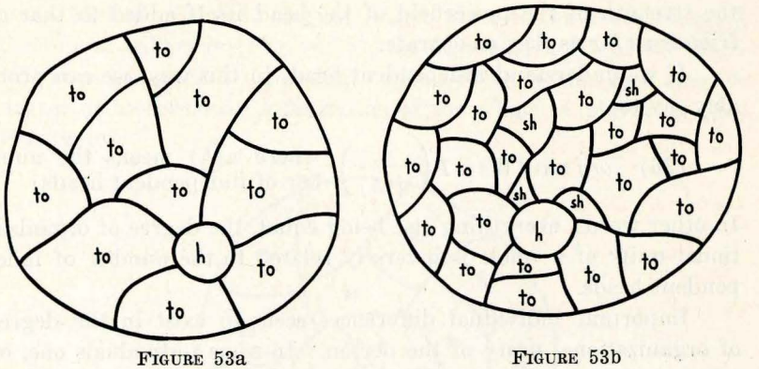


FIGURE 53a FIGURE 53b

FIGURE 53. Organization of a Whole

Figure 53a. Whole containing one leading part. *h*, head; *to*, tool.

Figure 53b. Organization of a whole containing leading parts and subleaders. *h*, head; *sh*, subhead; *to*, tool.

If the whole contains two or more independent heads, the organizational unity of the whole may be considerably reduced (Figure 54a). It is important, of course, whether the two heads are "friends" or "enemies." However, the formula (**35**) is probably correct if one understands the "power of the strongest head" to be

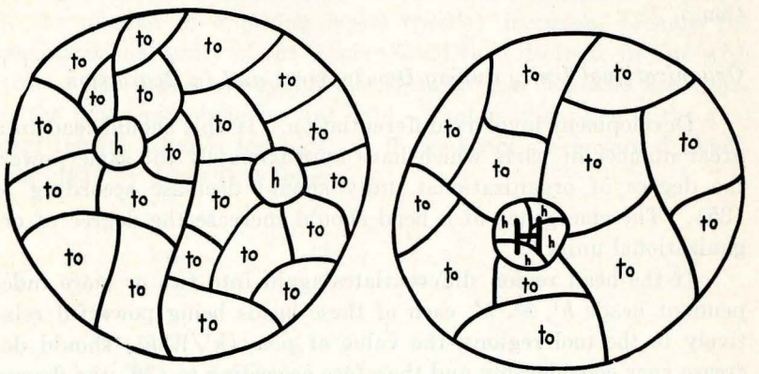


FIGURE 54a FIGURE 54b

FIGURE 54. Organizational Unity

Figure 54a. Whole with two independent leading parts. *h*, head; *to*, tool.

Figure 54b. Whole containing several leading parts combined into one policy determining group. *h*, head; *to*, tool; *H*, group of heads.

the strength of the powerfield of the head itself added to that of friends as far as they co-operate.

If we understand independent heads in this way, we can probably say that

(36) $org\ uni\ (W) = F\left(\frac{1}{n(h)}\right)$ where $n(h)$ means the number of independent heads:

In other words, everything else being equal, the degree of organizational unity of a whole is inversely related to the number of independent heads.

Important individual differences seem to exist in the degree of organizational unity of the person. In some individuals one, or a few needs seem to be powerful enough to suppress the other needs. In this case a relatively high general tension level may be expected. A rather different type of unity of the person is achieved if a number of heads of relatively equal powers are organized in a more "democratic" manner. In this case, the hierarchical organization is topped by a group of heads combined into one policy-determining part (H) of the whole (Figure 54b). If this H is considered as one region, the degree of unity of the whole is high, although no one all-powerful cell exists in the whole. It may be that the more harmonious and easy going persons show this type of inner organization.

Organizational Unity during Development and in Regression

Development involves differentiation. If this should lead to a great number of parts which have approximately the same power, the degree of organizational unity should decrease according to (35). The emergence of a head should increase the degree of organizational unity.

If the head region differentiates again into two or more independent heads h^1, h^2, h^3, each of these heads being powerful relatively to the tool regions, the value of $pow\ (h^1/W\text{-}h^1)$ should decrease very considerably and therefore according to (36) the degree of organizational unity should also decrease. We have mentioned (p. 27) that the increase of differentiation of the central needs during development may well lead to a decrease in the organizational unity of the person. If, however, the differentiation progresses so that one of the heads is predominant or in such a way that

a new higher head (hh) emerges which gives to the previous heads the role of subheads (Figure 55), the degree of unity of the whole will increase again in accordance with (35). In this case also the degree of hierarchical organization of the whole is increasing (See Figure 4c).

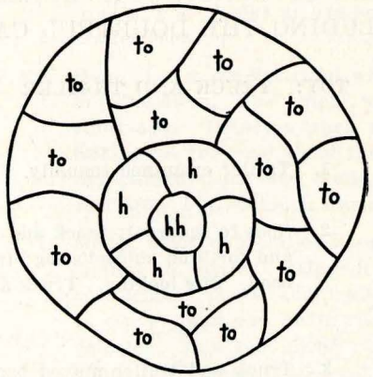


FIGURE 55. Hierarchial Organization
hh, highest head; *h*, head; *to*, tool.

Regression in the sense of disorganization should be expected if the number of opposing heads (needs) increases, because the organizational unity of the whole should then decrease in line with (36). The degree of organizational unity also decreases somewhat if the tool region becomes less fluid. That may happen if the general tension level is too high, or if the tools are governed simultaneously by conflicting forces.

Appendix 2

THE RATING OF CONSTRUCTIVENESS OF PLAY (INCLUDING THE DOUBTFUL CASES)

TOY: TRUCK AND TRAILER

Constructiveness 2

1. Superficial examination	1. Trailer examined casually.
2. Primitive, inadequate use	2. Goes to square 1; truck and trailer moved back and forth on subject's leg; truck and trailer on head. Sits looking. Truck and trailer on head.

Constructiveness 3

3. Primitive, obvious use	3. Truck and trailer moved back and forth while S sings. Looks at barrier, singing.
4. Transportation to definite place	4. "I like to play with the truck and trailer. I like to come over here." Truck and trailer taken to table. "I'll bring all the toys here."
5. Careful examination and delimiting of simple problem	5. Goes to square 1. Tries to detach trailer. "Can come out?"

Constructiveness 4

6. Successful solution of simple problem	6. Trailer detached from truck.
7. Same as 6	7. Detaches trailer from truck. Reattaches. "I know how to fix it now."
8. Primitive, adequate use and transportation to definite place	8. Truck and trailer backed under chair.

Constructiveness 5

9. Easy, skillful solution of simple problem as part of simple social play	9. Says, "I think it is this I want to play with," plays with truck and trailer. Is really interested. Is singing and satisfied. "I'll do a trick." Detaches trailer, pushes truck across floor. Laughs. Hums, reattaching trailer, goes to square 3. Looks at barrier, takes truck and trailer back.
10. Appropriate imaginative use on undeveloped level	10. Says, "I saw the fire chief when the house was burning down. Fire chief," while moving truck and trailer. Detaches truck, pushes about floor, talking all the time about the fire chief. Tries to reattach truck and trailer. Takes to E to reattach. Pushes truck around, talking.
11. Same as 10	11. Moves truck and trailer across floor to square 3, then to barrier. "Here it goes." Detaches, reattaches. Truck and trailer pushed around in circle; back and forth, making truck noises, detaches. In a good mood. Looks at observer's window. Pushes truck and trailer back and forth.
12. Used as tool for transportation of other objects; goal indefinite	12. Pegs taken from cup and put on truck and trailer. Pulls truck and trailer toward him. Teddy bear and doll put on chair out of the way, then truck and trailer is pulled toward square 1, along barrier. S does not shift position but stretches to limit in pushing truck and trailer toward square 1.

Constructiveness 6

13. Used as tool for transportation of other objects; goal definite	13. Takes truck and trailer. "Those things are going to be hauled." Cup, saucer, teapot. Talks. "Ride along, mister." To square 3.
14. Appropriate, imaginative use on developed level	14. Truck and trailer. "The bus went under the ice." "Bzzz, Bzzz, Bzzz. It came unhitched." Reattaches trailer. Duck made to swim to truck and trailer. "Will see if there is room for you, swan." Same for doll, sailboat, frog. (Voice very pleasant; mood bright and gay.)
15. Same as 14	15. Brings duck to table on truck. "Look, I caught a duck."

Constructiveness 7

16.	Creative, imaginative use	16. Sings while she reattaches truck and trailer. "I put it on wrongly. Now—Toot! Toot! It's going on the highway." Moving the small truck and trailer on the ironing board. Sings: "Highway, highway." Tips ironing board down and lets truck and trailer coast onto chair. smiles.
17.	Appropriate use in highly developed, imaginative play	17. Takes the truck and trailer and tries to put the ironing board on it. Says: "It won't go on." Pushes the truck and trailer. "I'll put something on to go." Loads cup, saucer, iron, and teapot. Telling in singing way what she is doing. She continues: "Now everything off. Now we'll go to Chicago, Chug! Chug!," as she pushes the truck and trailer in circles. "Now we'll go to Illinois." Carries truck and trailer around and loads it. The teddy bear is put on. "Chug!" Teddy bear falls off the truck. She remarks: "Oh! Teddy bear, he fell off." She puts the teddy bear on and pushes the trailer around in circles. "Chug! Chug! Teddy bear has to get off now." Talks about teddy bear and doll on the truck and trailer, about where they are going, and about the nice teddy bear: "Oh! Teddy bear fell off too-too." She says loudly, while pushing the truck and trailer in circles: "Toot! Toot!" She moves the truck and trailer to square 3. Puts boat and duck on and explains, "I'll put the boat here, a swan here. Toot! Toot!"
18.	Same as 17	18. Takes truck and trailer to square 3, frog placed on truck and trailer. "Here is a frog. The frog and the duck have to be taken away." Boat placed on truck and trailer. "This is a broken boat. The truck has a lot of things to haul." Hauls to square 1, removes things. "Now, we go on the bridge." Duck placed on trailer. "He has to swim." Truck and trailer reattached. "First the duck takes a ride in the new Dodge. Now, they go around to take somebody else, too." Takes frog for a ride in the middle of the room. "Say, they all come off too." Truck and trailer detached.
19.	Same as 17	19. Takes truck and trailer saying, "This is police ambulance. Here it comes." She makes it go around. Detaches trailer from truck and says, "Look!" then puts it back together. Takes ironing board and iron. Leans ironing board against the barrier and says, "I'm glad I'm home, I'm glad I'm home; policeman says, 'Everything is fixed for supper'."

Constructiveness 8

20.	Inventive, imaginative use. There may well be some question if this should be rated higher than 16.	20. To square 1, truck and trailer reattached, "I'll bring them here." Detaches truck, has it coast down trailer as an incline; reattaches.

TOY: IRON AND IRONING BOARD

Constructiveness 2

21.	Manipulating without examination or use	21. Touches iron.
22.	Transportation without definite goal	22. Picks up iron; walks about.

Constructiveness 3

23.	Careful examination and delimiting simple problem	23. Goes to square 1, picks up ironing board. "How do you put it down? Mother has one which you can put down."
24.	Transportation to definite place	24. Iron and ironing board carried to wall.
25.	Same as 24	25. Takes ironing board from square 1 to E. Opens, manipulates, and repeats unintelligible question many times. Asks E to fix ironing board; brings to square 1. Back to E with ironing board and iron.

26.	Developed inadequate use	26. Goes to square 1, gets on chair, irons teddy bear, hums, irons saucer, holding teddy bear in hand, irons truck and trailer on floor, says, "I'll iron the truck and trailer."
Constructiveness 4		
27.	Successful solution of simple problem	27. Returns to ironing board, which he tries to set up as he continues singing. "How do this?" "What's that?" hears hammering sound in north room. "How do this?" (erect ironing board). Succeeds and places in corner.
28.	Careful examination and obvious use	28. Goes to square 1, takes iron, manipulates and examines it, then manipulates and examines ironing board. Places ironing board before her, turns it over, tries to unfold. Picks up iron, irons three or four times, examines iron.
Constructiveness 5		
29.	Appropriate, imaginative use on undeveloped level	29. Puts iron to cheek. "Oh, this is hot." Tests iron.
30.	Same as 29	30. Goes to ironing board. Sits down, putting ironing board in front of her and draws. Talks about and plays with iron. "My iron is better than yours. Look at the big iron way up in the air. I can iron this high way." Plays with ironing board. "Do you think it is doing nice?" Comes with iron to E. Puts it at E's arm. "It is hot." Back to chair, ironing, talking.
31.	Same as 29	31. Irons bit of paper on floor. Examines paper and irons.
32.	Same as 29	32. Places iron on ironing board, irons. "It's hot." Takes iron to E to show how hot it is.
Constructiveness 6		
33.	Appropriate, imaginative use on developed level	33. Whispers, tears square from paper, places on ironing board, irons it carefully. Takes another piece. Irons it. Examines ironing board, irons, puts iron back in place.

34.	Same as 33	34. Takes diaper off doll. Irons diaper on ironing board, attempts to put diaper on, but does not succeed.
35.	Same as 33	35. Puts iron in ironing board. Tries to take the ribbon off of the bear, but does not succeed. Irons the ribbon around the teddy bear's neck. Tries to fold up ironing board. Removes diaper from doll and irons diaper.
36.	Unique use on simple level	36. Says, "I better iron his clothes now." Takes iron to square 2. Irons clay, after asking permission. "Look what it did! I'm just pressing it so it's smooth."
37.	Same as 33	37. S is continuing her ironing, "I'll just iron my own dress." Puts own skirt on ironing board and irons. "Now, doesn't that look pretty?"
38.	Same as 33	38. Turns to square 1, with duck (smiles) looks at toys. Picks up iron (whispers). Walks with iron to radiator, places iron on radiator; feels of iron to see if it is warm, looks out window, feels again, again, again. "Gets hot." Smiles. "Hot," to E (laughs).
Constructiveness 7		
39.	Creative, imaginative use	39. Takes iron to square 1. Holding iron in hand, looks about. "Haven't you something to iron?" E "How about the paper?" Looks at paper. "I want something really to iron, not something to play iron." Rubs fingers over iron, irons his face. To square 3, tests iron, "I'll iron this." Takes from square 2 to 1, places on ironing board. Attaches cord of iron to barrier so it will be "nice and hot." Irons a long while. "I'm through ironing. How do you shut it?" (the ironing board).
40.	Appropriate use in highly developed imaginative play	40. "Now, the daddy's going to iron?" Iron picked up. Puts sailboat and duck in the "garage." (in truck and trailer) "Now the daddy gets in the house and irons." Sits on chair, paper on ironing board. "Which shall I iron first?" Brings iron to E. "See if it's hot. My, it is hot, isn't it?" Back to square 1, irons. "It's raining, and I guess I'd better get the clothes in." Runs about gathering up paper. "Here's

	the daddy gathering in the clothes." Back to chair. Irons.
	TOY: PHONE
Constructiveness 2	
41. Manipulating without examination	41. Shakes phone while looking about.
42. Superficial examination	42. Goes to square 1. Looks at phone.
43. Same as 42	43. At phone, looks at E, smiles and says, "Oh!" E smiles back and says, "It's a telephone." She shakes it. "What is it?" Laughs.
44. Transportation without definite goal	44. Phone in hand, walks about looking at other things.
Constructiveness 3	
45. Careful examination; delimiting simple problem	45. Shakes phone. "What does it say? Does the teddy bear make a noise?" (Thinks that the noise in the phone is produced by the teddy bear)
46. Transportation to definite place	46. Carries phone to ironing board.
Constructiveness 4	
47. Obvious use	47. Has phone, shakes again; smiles at E, puts phone to ear. Asks E question in regard to phone. Shakes hard.
Constructiveness 5	
48. Appropriate imaginative use on undeveloped level	48. Puts phone to ear, "Hello!" Shakes, examines phone.
49. Same as 48	49. Goes to square 1, gets phone, brings it back to chair. Returns to square 1, holds it in phoning position, whispers, shakes.

Constructiveness 6	
50. Appropriate imaginative use on developed level	50. Has phone, carries on long excited conversation. Takes phone to E, places at his ear. E says "Hello."
51. Same as 50	51. Goes to square 1, examines phone. "What is in here?" E, "It speaks there." S understands. "Doggy there." Shakes. "Hello!" Puts phone to ear. "This isn't a live doggy. Hello doggy! Hello doggy!" Shakes. "He does not say 'Hello!'" Shakes. "Doggy, hello!" Puts phone to ear. Puts phone on truck and trailer, holds receiver to ear. "What do you want?" Talks to E, hits face with receiver. Shakes phone, then places on truck and trailer. "They have to take the phone with them!" Phone to ear, "What do you want?" Repeats. "Hello, what do you want? (laughs) He doesn't want to say hello! Say what do you want, you dummy? (laughs) I say dummy to the doggy." Enjoys talking into phone and putting phone on truck.
52. Same as 50	52. Shaking phone while holding doll in lap; puts phone to doll's ear. Teddy bear in lap, puts phone to teddy bear's ear. Shakes phone, puts it to frog's ear. Shakes phone, puts it to duck's ear.
53. Same as 50	53. Goes to square 1, shakes phone. Asks four times in telephone "Who is talking so loud?" While standing near E says, "Phone for you." Gives to E. E, "Hello, for goodness sake, Goodbye." "What did she say?"
Constructiveness 7	
54. Use of phone as imaginary substitute	54. Talks over phone. "I'm going home pretty soon, save some clay for me."
	TOY: DOLL AND TEDDY BEAR
Constructiveness 2	
55. Manipulation without examination or use	55. Has bear in hand, throws it down.

56.	Identification	56. Says, "See the teddy bear."
57.	Superficial examination	57. Sits on chair. Examines doll and bear casually.

Constructiveness 3

58.	Primitive, obvious use	58. Sits in chair, holding teddy bear and doll carefully in arms.
59.	Same as 58	59. Goes to square 2 and gets teddy bear. To E, "He's my sweetie!" Goes back to square 2.
60.	Same as 58	60. Spanks teddy bear.

Constructiveness 4

61.	Imaginative, inappropriate use	61. Looks at chair, places teddy bear on it, then throws teddy bear down. Puts teddy bear in teapot head first. Talks to self. "Look at him. Funny teddy bear. Isn't he funny? When the tea pours he will get wet. He looks like a horsey to me. It does look like a horsey, doesn't it?" Talking to self and teddy bear. Throws teddy bear down. Hits teapot with teddy bear.
62.	Obvious use	62. Picks up doll, starts to put on chair, but then puts it on truck. Says to E, "Open this, will you?" (diaper) Sits on chair at square 1; again remarks about diaper. Gets diaper, says, "I have a doll but I have no ironing board."
63.	Same as 62	63. Reaches doll, sits on chair. "Can't this girl open her legs? This doll is cute." "Did you know that?" "See, her hands are up high now. Isn't she cute?" (much expression in voice) Gets teddy bear and kisses it. "Gave him a big kiss, a big kiss."
64.	Same as 62	64. Has doll and teddy bear sitting carefully beside her.
65.	Appropriate, imaginative use on undeveloped level	65. Goes to square 1. "I'll sit in the chair, and rock the teddy bear to sleep." Leans back and rocks. "The teddy bear doesn't want to go to sleep, he wants to play." Continues to sit and rock.

Constructiveness 5

66.	Same as 65.	66. "See this baby (doll) is one and this (teddy bear) is two. They have to take their nap." Places on ironing board.

Constructiveness 6

67.	Unique imaginative use on simple level	67. Doll rides on frog. S says, "When I was a baby, I used to ride on a duck." Then puts the doll on the boat.
68.	Appropriate imaginative use on developed level	68. Says, "Naughty teddy, I'll spank you. He sucked his thumb." Takes teddy bear to E and says, "See teddy's funny face."
69.	Same as 68	69. Brings the teddy bear to the table, leans over the table and says: "See him, see him. Ha! Ha!" Has teddy bear on E's paper, interfering with E's work. "I have a bigger teddy bear. I have a bigger one than you." — "Can the teddy put his legs up? Here teddy, I'll put the teddy up." Puts chair on E's table. Excited about putting teddy on chair. "Teddy bear is a nice teddy." The teddy bear falls off the chair. The child warns: "Don't get in the water! Stay here, stay here! Sit here and watch mother iron. O yes, you may, you may." Then addressing E, "Is this a rocking chair?" E answers: "Something like a rocking chair." The child says to the teddy, "I'll iron and you can watch me, teddy." Then she sits before the ironing board on chair, has truck and trailer, iron, cup, saucer, and teapot on ironing board and rocks herself.
70.	Same as 67	70. Puts bear on ironing board in middle of room. Irons. Raises ironing board. Irons the bear and says, "I'm burning this teddy. He is naughty."

TOY: CHAIR

Constructiveness 2

71.	Primitive	71. Stamps across to square 1, sits on chair and

manipulation, examination	rocks hard. Walks to middle; knocks ironing board over; does not pick it up. Tries to sit on chair in various ways.
72. Transportation without definite goal	72. Chair carried about; walks about asking questions.
Constructiveness 3	
73. Transportation to definite place	73. Goes to square 1, brings chair to table.
74. Primitive obvious use	74. Sits on chair with teddy bear in lap.
75. Careful examination	75. "Is this our chair? Where did you get it? A big chair cost a lot of money?" Sits on chair, turned to E, talking indirectly. "Aren't these cute?" (pictures on chair). Looking at it for a long time and talking about it. Moving the chair back and forth. Lifting chair, "I can lift it as high, can you lift it as high? Look, I can do it this way."
Constructiveness 4	
76. Examination and obvious use	76. Examines chair, sits on it beside ironing board in order to iron.
TOY: CUP AND SAUCER	
Constructiveness 2	
77. Primitive manipulation	77. Taps table with cup. Puts cup under table. Knocks cup and saucer together.
78. Same as 77	78. Stands, cup in hand; looks at E; manipulates cup in hand; looks at E; remarks to E about writing. Takes cup, and manipulates it restlessly in fingers.
79. Same as 77	79. Saucer picked up and manipulated. Throws saucer and looks at E. Smiles; gets saucer; makes whistling noise for E's benefit.
Constructiveness 4	
80. Obvious use	80. Takes cup, puts on saucer.

TOY: TEAPOT	
Constructiveness 2	
81. Manipulation without examination	81. Takes teapot in hand.
82. Primitive manipulation	82. Makes noises shaking teapot.
Constructiveness 4	
83. Obvious use	83. Gets teapot at square 1; carries to E's table, explaining something about it. "Pours" tea.
84. Same as 83	84. Teapot, saucer, cup put on ironing board as for meal, i.e., "setting" the table.
Constructiveness 5	
85. Appropriate imaginative use on undeveloped level	85. Cup and teapot manipulated. "Pours" tea and drinks.
Constructiveness 6	
86. Appropriate imaginative use on developed level	86. Goes to square 1, sits on chair. Has teapot and cup, pours into cup. "That is coffee." Talks to himself about apple juice and other things to drink. Pours again and again.
87. Same as 86	87. Has teapot. "Do you want some coffee?" Takes cup to E. "Here is some tea." Pours for E. "Drink it." E drinks.
88. Same as 86	88. Goes to middle of room; takes teapot to clay at square 2. Small pieces of clay put in teapot; goes to cup at square 1. Pours clay from teapot into cup, clay emptied back.
89. Same as 86	89. Puts fishing pole on window sill; gets teapot off window sill, and stirs with crayons.
90. Unique imaginative use on simple level	90. Goes to square 1. Puts saucer on teapot. Laughs. "This is going to be the lid of the teapot." Laughs.

Constructiveness 7

91. Appropriate use in highly developed, imaginative play	91. "I have an idea." Takes clay board and puts it on ironing board. (Talks to herself most of the time.) Sits down on chair before ironing board and clay board. "I'm pretending I have a tea party." Puts clay board on head. (Laughs) "Did you hear me say I'll have a tea party?" Puts clay board on head again. "This is the only way I can put it on my head. I'll put it right here." (on ironing board) It falls off. Picks up clay board. Takes clay off. Puts cup, saucer, on clay board. Sits down to tea table, takes cup, pours from teapot, gets up, removes tea things. Removes clay board. Picks up ironing board. Asks E questions. Replaces tea things on clay board. Sits down. Knocks tea table over. Sets ironing board up, gets clay board. Places it on ironing board. Does same with teapot, cup, saucer. Pours tea into cup. "Did you hear the fire engine yesterday?" E, "No, I did not." S tells about boy. Teapot replaced. Sits down to tea table, knocks it over again. Smiles. Sets ironing board up, clay replaced. Cup, saucer, teapot replaced. Sets chair up to tea table. Gets teddy bear and examines. Sits on chair. Speaks in a sweet voice to teddy bear, "Teddy bear, you sit right there. Shall I sit with you?" Pours tea. (To E in a different voice.) "I have a big teddy bear at home." Rocks with teddy bear, cup in hand. Smiles, has teddy bear drink from cup. Smiles. "My mamma feeds my teddy bear tea. Still sitting, making teddy bear drink. Pours more tea. "The teddy bear can hardly reach." Smiles. Gets up. "Teddy, you better sit here." Then, "I'll hold you some more." Pours more tea, singing to herself. Sits down, moves table nearer. "Has the teddy bear had a drink? Can't get teddy to drink." Sings for a while. "Can't get teddy to drink." Slaps teddy bear. More tea given to teddy bear. Rocks while teddy bear drinks. Looks about. Sings real melody. Teddy bear sat on table. "Do you want to sit here, teddy?" (Said sweetly) Gets up, teddy bear left on chair. Stretches. (Sighs, happily.) Table knocked over (accident), laughs, teapot replaced. Sits down, smiles. Teddy bear in lap, rocks.
92. Same as 91	92. "I'm going to make some tea now." Takes teapot, puts doll on chair, also teddy bear; pours tea; pretends doll and teddy bear drink. "Bear gets some more." To E, "the teddy has to get as full as the baby."

TOY: CLAY

Constructiveness 2

93. Manipulation without examination	93. Goes to square 2 and manipulates clay.
94. Transportation without definite goal	94. Walks about with cup and clay in hand.
95. Primitive manipulation	95. Goes back to square 2, throws clay at observer's window. "Bang! Bang!" Repeats.
96. Primitive manipulation and inadequate use	96. Goes to square 2. "I'll make a snow man." Hits clay hard on board. Then *eats* it. "Shall I eat this clay?" Hits clay hard on board. Twists clay in hands, holds it in mouth. "I really swallowed it." Throws clay down. "I guess I'll not play with this." Throws violently.
97. Same as 94	97. Goes to square 2 to clay. "I'm going to step on it." Steps on clay. Stamps on it.

Constructiveness 3

98. Primitive adequate use	98. Takes clay, and starts to mold: "I want some more clay. This is not enough. I want some more. Don't you have more in the other room? Yes, you do!—I'll make a stretch. (Breaks piece of clay off) — You see, I'll put the pieces together. I'll put this right here, see?"
99. Same as 98	99. Takes clay in hand. "Is this to play?" E, "Yes." "How?" Takes small pieces off. "Look at this big one." Shows a big piece of clay. Puts them at different places on square 2. "Look!" Shows E two pieces.

100.	Same as 98	100. Takes clay to rear door on sill. "Holes in it." Breaks into small pieces and puts down. "Holes in it." Repeats. Looks at E and smiles, stuffing clay into key hole. Runs for more clay, stuffs into key hole, yells delightedly, again, clay stuck on to wall. "Look," screeches delightedly. To lock, manipulates. Makes it swing, laughs. Another piece of clay stuck to wall. "Look." "Two of them. Another, look, another!"
101.	Transportation to definite place	101. Back to clay, takes small piece, "Look!" Gets up and brings clay to E. "You want?"
Constructiveness 4		
102.	Obvious use	102. Puts all clay pieces together in one pile, brings to table; climbs on radiator, puts clay on sill. "This is a house?" Clay has no likeness to house.
103.	Obvious use	103. "What is this?" (clay) Puts on board. Kneads. "You don't care if I break it in two." Breaks off another piece. Pats it down on board. Another piece broken. "Look what I made, a big roast." No likeness. "I made a little ball." (Irregular pieces torn off) "Look what I did." "You couldn't break that fast." (gleeful shout) (talking loudly) "See, this is a big, hard piece." "You couldn't break it, could you?" Presses small piece against the board. (squeal of delight) "See, I put my little finger in." "Here is a little tiny one, and look at all the big ones, look! look!"
Constructiveness 5		
104.	Appropriate imaginative use on undeveloped level	104. Manipulates clay. "I want to take this home and cook it." Pinches and bends clay; pats it out. "Look what I made; it's a cookie."
105.	Simple play	105. Takes clay to square 1; to square 2; places in paper and wraps up carefully; spills it out, rewraps, and carries to barrier; piles clay against barrier; drops it, wraps it up; carries to square 1; pinches off a piece and carries to observer's door; puts on floor, presses. "Another, another. Look! Oh look!"

Constructiveness 6		
106.	Appropriate imaginative use on developed level	106. Carefully models boat out of clay; copies boat on square 3.
Constructiveness 7		
107.	Like 106, but with more skill and originality	107. A piece of clay torn off; then another. All kneaded together. "I'll make a cat lying down. Here are his four paws. I'll make his front paw." More pieces broken off. "Now I'll make something else. Here is a baby." Talks to herself.
Constructiveness 8		
108.	Similar to 106, with more skill and originality	108. "I know what I'll do, I'll use the clay. It's very dry. When did Arthur come to this game?" All the time putting clay in cup. "Look what I did." Clay packed down in cup; noise at observer's window. "What is that?" Goes back to clay play, making fringe of clay around edge of cup, working clay up from bottom. Working very slowly. "Look what I did." Quite pleased. Looks at observer's window. Gets up to look better. More noise from outside. Works with cup and clay while standing. Picks up paper, "Is that the same picture?" Back to clay immediately, finishing fringe about cup. Working very intently, completely involved. Clay fringe around cup, completed.

TOY: CRAYONS

Constructiveness 2		
109.	Primitive, inadequate use	109. "I'm writing on my shoe." Colors shoe. Sighs very disconsolately.
110.	Manipulates without examination or use	110. Reaches crayon behind him; holds in lap.

111.	Same as 110	111. Picks up crayons and fingers them while looking at E.
112.	Same as 110	112. Dumps crayons and paper.
113.	Same as 110	113. Picks up crayon box and rattles crayons back and forth.

Constructiveness 3

114.	Transportation to definite place	114. Gets crayons. Carries them about, to window, leaves some of them.
115.	Careful examination	115. Crayon examined carefully.
116.	Same as 115	116. Picks up crayon and shows to E smiling. Sits taking paper off of crayon.

Constructiveness 4

117.	Obvious use	117. Takes crayons and scribbles.

Constructiveness 5

118.	Appropriate, imaginative use on undeveloped level	118. To square 2, "I'll play with the crayons." Puts crayon in box with great care, naming colors.
119.	Same as 118	119. Picks up papers, takes them to table, "Over here." Spreads papers out on table; colors with pink crayon. "I'll take the paper off." Unwraps crayon; colors; dots; long line, like writing.
120.	Same as 118	120. To square 2. "I'll write D-S-T-Y." "I guess I better use this one." Writes. "Look what I did." (great glee) "This is yours, and this is yours." Gives pictures to E.

Constructiveness 6

121.	Appropriate, imaginative use on developed level	121. To square 2. Gets crayons; sits with her back to barrier; draws (scribbles). "New crayon, crayon, crayon, crayon." (All different colors) Counts colors to see if she has used them all. Sits looking at colors, takes one, looks out window. Pushes truck and trailer over with foot, scribbles rapidly. "Look at my rainbow."
122.	Appropriate, imaginative use on developed level	122. See item 89.
123.	Same as 121	123. Colors with red pencil. Whispers to self, makes letter, "See my A!" Tells story, making marks. "He went up here and ran down down and then started up and they weren't there," etc. "See, it's just like a duck, there, see my funny duck." Scribbles in big circles.
124.	Same as 121	124. Gets up, comes to E, then to square 2. "Guess I'll color." "What shall I color?" "I guess I'll scribble." "No, I'll make rain." "Where is the blue?" "Shall I make the blue sky?" Kneels coloring. "Oh, look at that blue sky!" "Why don't we go out this door?" (Observer's window) "Oh, this crayon broke; is that all right?" Colors. "Mary Brown broke this piece." "I hope she didn't cause I don't like her." Colors with red along one side. Back to barrier. New crayon. Sings as colors. "I know something no one else does — it's my cousin, and I'm not going to tell them, and I don't care." "They're playing outdoors, aren't they?" Crayon in each hand. Changes colors frequently, making straight lines in the center. Sighs as looks at work. Colors. Seems quite interested in work now. "Look, what I made." Turns facing barrier, colors. "Now look!" E, "What is it?" "I don't know, just something." "If I only had purple." "Oh, I was sitting on it." Scribbles across the whole thing in big strokes, rapidly. Shakes paper and shows to E.

Constructiveness 7

125.	Creative, imaginative use	125. Foot outline traced with crayon. "Look!" "See my foot. I can't make a picture of it." E, "Why?" S, "Because I can't. Look, this one did not go good."
126.	Same as 125	126. Starts to draw. "Look at it," making a line. "I'll see what I can make." Draws on big

square. Names colors which he chooses: purple, pink (laughs at E), brown, white, green. "There is light green. This is dark green, isn't it?" (Is very interested. Involved in play.) "I'll have to see this — it is yellow," (lying down on side). "Smoke comes out of chimney here" (first made a few scratches just for the purpose of trying out colors). Draws, (laughs). Makes blue, small lines, (enjoys it). "That's funny that there are so many browns." (Lying down on side) "Here is purple. You have three oranges. Here is one orange. Here's another orange. There are all different colors, aren't there?"

TOY: FISH POLE

Constructiveness 2

127.	Transportation without definite goal	127. Pole in hand, goes to center.
128.	Manipulation without examination	128. Swings fish pole.
129.	Same as 134	129. Gets fish pole, winds line about hand, puts cord in mouth, stretches cord across nose, looking at E, a little embarrassed when E catches her glance. Cord around neck pulling it absentmindedly as she stares before her. Winds cord.
130.	Same as 128	130. Throws fish pole across room.
131.	Casual examination	131. To square 3, then to E, "What's this?"
132.	Manipulation and casual examination	132. At square 3. Gets the fish pole. "Where did you bought this?" E, "At the store." Swings and manipulates fish pole.

Constructiveness 3

133.	Transportation to definite place	133. Fish pole in hand, walks about, "I want to hook this to something."
134.	Primitive, inadequate use	134. Fish pole manipulated, carried; used for digging clay.

135.	Careful manipulation	135. Swinging fish pole. "See how far it goes now." Sings, "1, 2, 3, — see it slow up." "I'll try to keep it off the floor." "Do you know something? I better ——." Hitting magnet on the floor swinging.

Constructiveness 4

136.	Simple use	136. Fastens fish line onto bolt in wall. "Why do they put these things here?"
137.	Same as 136	137. Attaches duck on fish line. (Smiles) "Is this a toy horseshoe?" "I'm going to fish the motor boat this time." Looks at barrier. Tries to attach magnet to boat. Swings magnet, dangles magnet. Lets fall on floor. "I'll fish the fish." Fishes for sailboat. Tries to attach magnet. Jiggles magnet. Swings magnet. Sailboat picked up. "Oh, the sail turned. It is all broken. I can fix it."

Constructiveness 6

138.	Appropriate, imaginative play on developed level	138. S is fishing on square 3. "I got a fish. We will eat you up. I'll put it on top of your paper." Going back to pool, "Can this go in the water?" Puts the fish on square 3 (into water).
139.	Same as 138	139. "I'll take the fish pole." (Laughs) Fishes for the fish and duck on square 3. "Here is a very fine catfish he caught. Now, he gets a duck."
140.	Same as 138	140. "Say, where is the truck I had?" Finds it; attaches magnet to trailer by accident and drags it with fish pole to barrier, attaches trailer curtain cord. Pulls trailer by fish pole. Puts truck on trailer, "Cars running up the trailer." To table pulling trailer by fish pole.
141.	Same as 138	141. To E, "What if I fished and caught a fish?" Manipulates frog, a duck, and a boat. (Laughs heartily) "I'll fish, a frog might bite it. The old frog came up and bit it, he thought that it was a frog that came up and bit it. You might wind it around his arm. (Does) See, he's caught. And it might catch a boat, the people think it's something else."
142.	Same as 138	142. Talks to self, "Look now." Swings duck, "swoops" it over the square on fishing cord.

Hovers duck over frog talking to the animals, telling what duck is doing to the frog, pulls duck across floor and over his legs, carefully. Lets it fall on other side, sings "Big Bad Wolf." Brings frog over to duck on his knees, telling story. Swings duck over square 3. Duck unhooked. "Look, he got off." Rehooks duck, "It was right under his bill, now, I'll catch something else." Puts duck down. Puts pole down.

Constructiveness 7

143. Creative, imaginative use — 143. Goes to clay at square 2; sticks magnet in clay. "This is fine, aren't you glad it can carry things?" Swings big piece of clay stuck to magnet. Gets clay stuck to floor. "It won't come up." Keeps sticking magnet in trying to get it to pull clay up. Magnet comes out with jerk. Seven times. Gets it to stick. "Look, I got it, look!" Falls off. Yells with delight. "I'll put some clay around it." Sticks small pieces of clay over magnet to make it stick. "Mrs. Geewax is right," repeats, repeats, repeats. "It's going to pull the whole thing. Whee! Did you see that? Whee!"

TOY: BOATS

Constructiveness 2

144. Superficial manipulation — 144. Manipulates boat.

145. Takes sailboat from basket, places on floor.

Constructiveness 3

146. Careful examination — 146. Gets boat; examines carefully. "Please make this boat go. I can't." Removes "cabin." "This is where you hold it." Manipulates light of boat. Boat on floor.

Constructiveness 4

147. Obvious use — 147. Pulls boat on floor.

Constructiveness 5

148. Appropriate imaginative use on undeveloped level — 148. "Here is what I can do too." Ties boat to fish pole cord which extends through square 3.

Constructiveness 7

149. Appropriate use in highly developed imaginative play — 149. Examines boat and sailboat. Talking and moving; playing with back to observer. Talking to self, "He goes home." Duck on boat, attaching rope of boat to duck. Glances at E, lying on stomach, sing-song story about a boat. "It's a different kind of boat, isn't it? Now he's in the water. The duck is tied on. See, there he is." Duck tied to boat. "Look, now I got a frog. Now, she'll go." Voice more expressive. (Evidently playing a complex story)

150. Same as 149 — 150. "Why are there two boats?" Makes sailboat go around the house and makes noise like a boat. "Now I put it in the boathouse, now I go to real boat." Makes it go about with engine noise. "I'm going fishing and boating at the same time." Makes boat go around, also fishes.

TOY: FROG AND DUCK

Constructiveness 2

151. Primitive, inadequate use — 151. Frog picked up, punches destructively; tears frog apart and then throws away.

152. Transportation; no definite goal — 152. Carries swan and frog in hand.

153. Casual examination — 153. Examines duck and says, "Quack, Quack, Quack!"

Constructiveness 3

154. Careful manipulation and — 154. Goes to square 3. Picks up boat, removes cabin; inspects frog, "He's wet." Manipulates. Inspects duck. Talks to E about duck being

examination	wet. Places duck and frog head to head. Whispers, puts frog on floor.
Constructiveness 4	
155. Obvious use	155. Pushes frog and boat over floor, clear to barrier, (whispering). Back to square 3; takes duck by same route, to barrier; back to frog, at barrier.
156. Same as 155	156. Takes duck in hand, "Where is a faucet? I want him to swim in water."
Constructiveness 5	
157. Appropriate imaginative use on undeveloped level	157. Carries frog about saying, "The froggy, the froggy, he says, 'cluck, cluck.'" Hums pleasantly.
Constructiveness 6	
158. Appropriate, imaginative play on developed level	158. Says, "It's a naughty, naughty duck. I'll feed you something soon. Quack!" Has duck eat.
Constructiveness 8	
159. Unique, imaginative use	159. "Now, I catch a duck. Oh, I caught a duck." Repeats eight times. "I let his blood run out." To square 3, singing.

TOY: AGGREGATE PLAY (SEVERAL TOYS WITH NO ONE DOMINANT)

Constructiveness 2	
160. Primitive manipulation	160. Picks up crayon, shakes phone, pushes truck and trailer, manipulates clay.
161. Transportation without definite goal	161. Gets clay at square 1, asks E question, steps on paper, drops doll, takes paper to square 1.

162. Manipulation and casual examination	162. Examines phone, shakes, touches doll, pushes truck and trailer back and forth, touches iron.
Constructiveness 3	
163. Transportation to definite place and careful manipulation	163. Child goes to square 3, looks at things on square 3. Puts drawing down, takes up fishing pole, puts pole near ship. Goes to duck with pole, goes to motor boat with pole holding duck in hand.
164. Transportation to definite place and examination	164. Goes to square 3, examines boat and takes it apart, leaving fishing pole on floor. Takes boat to window. Then takes sailboat to window, frog to window, duck to window. Goes to square 1 and takes bear and doll to the window.
165. Careful examination	165. Walks to square 3, manipulates sailboat, brings duck to table, shows it to E, back for boat and fish pole. Stands by table examining fish pole, boat, manipulating light on boat, unscrews light, takes sailboat to table, detaches sail from boat, whispers "I break it." Whispers about boat and clay. Standing near and leaning against E.
Constructiveness 5	
166. Imaginative use on undeveloped level	166. "If I only had something to dig with." Goes to square 3. "Oh, doesn't the fish pole have any hook? Oh, the frog looks like a turtle, and this is an old boat. This is a house boat, isn't it, and a duck?" Fish pole taken up, whirls about, swinging magnet. "I really could get some fish with a real fish pole. I guess I'll pick the duck up, no the frog." Tries it.
167 Same as 164	167. "Now, I must go." Places doll and teddy bear on ironing board, manipulates iron, puts cup in teapot, rolling pin on plate, all placed neatly beneath ironing board. Knocks ironing board over; puts up again. Doll and teddy bear put on it, also phone, saucer, teapot, cup, and iron.
Constructiveness 6	
168. Imaginative	168. Duck on square 3. "She swims around in the

play and highly developed level	water." Smiles. Makes duck go around. Makes sailboat. (Smiles) Puts duck on square. "Here's the swan. He tries to float." (Looks at barrier, smiles) Lies down on side. Smiles. Puts all things to one side, smiles. "The duck is coming. The water baby comes." Lies down (smiles). Toys all lined up at one side. "Put, put, put!" Makes boat go. Tries to fasten the boat (smiles) "Tick, tick, tick, tickle, tickle, tick," as puts fish pole and magnet on boat. Takes teddy bear from truck and trailer. "Here's the swimming bear." Makes it swim to west side of pond, lines it up with doll, sailboat, frog, and duck.

Appendix 3

RECORD OF TWO CASES OF GREATLY INCREASED CONSTRUCTIVENESS IN FRUSTRATION

SUBJECT 18

Free Play Situation

	1. S enters, goes to square 1. "What is this?" Shakes phone. "What makes the noise? Do you think there are people talking?" Constructiveness 2; 60 seconds
	2. Goes to square 3, takes duck in hand, "Big duck." Constructiveness 2; 10 seconds
Investigation	3. Back to square 1, "What is this?" (Truck and trailer.) Constructiveness 2; 20 seconds
	4. "Can I take this off?" Removes chair from square. Constructiveness 2; 35 seconds
	5. Takes teapot in hand. Constructiveness 2; 5 seconds
	6. Rolls rolling pin. "I'm making something." Makes motions of cutting. Constructiveness 5; 30 seconds
Play	7. Pours tea; talks to self about being thirsty. Constructiveness 6; 10 seconds
	8. Truck and trailer pushed around in a circle. Child in a very good mood. "This came off." Engine noise. Constructiveness 5; 45 seconds
Investigation	9. Examining doll, puts doll on chair, talks to "dolly" and "teddy bear." Constructiveness 5; 55 seconds
Play	10. Takes phone, "I'd better call up someone." Pretends to talk. "Nobody answers; I just hear a cry — just hear a cry." "Hello" to E. Constructiveness 5; 60 seconds

Play	11. Goes from squares 1 to 2. "What are these pegs?" Places peg. Takes two yellow pegs; talks to self. "I'll see whether they stick out from the bottom." Turns board over and examines it. Puts in red, orange, and three yellow pegs — takes yellow one out and puts green in. Seems to be selecting colors. Enjoying every one. Removing and placing pegs. Talks to herself and fills out row. Remark to E. Constructiveness 6; 235 seconds
Examination	12. Beads taken in hand, asks, "Where do you color on?" E. says, "On this paper." Has beads in hand whole time. Constructiveness 2; 15 seconds
Play	13. Colors with crayons very briefly. Constructiveness 6; 10 seconds 14. Piles beads. Constructiveness 5; 20 seconds
Diversion and examination	15. Looks at E. 15 seconds 16. Goes to square 3, examines frog and says, "Froggy." Constructiveness 2; 25 seconds
Play	17. Sails boat, "Oh, the funny man! What made this wet spot?" Constructiveness 5; 45 seconds
Examination and brief play	18. Duck: "Here's an old ducky — old ducky — old ducky"— several times. Constructiveness 2; 15 seconds 19. Boat: "Here's an old shippy." Manipulates. "How did this get loose? There is a part which got loose. People sit away back there." Looking at E for approval as she talks. "Do you pull the boat with the string? Chug! Chug!"— pulls boat about. Constructiveness 5; 140 seconds 20. Takes fish pole, "What's this? Which end goes in the water?" "How do fishes get on? Can I fish a frog or a duck?" Catches frog; looks at E. Pulls magnet across the paper. Constructiveness 5; 70 seconds

Examination and brief play	21. Walks around swinging magnet. Goes to square 1. Constructiveness 2; 45 seconds 22. Goes to truck and trailer, examining and moving. Constructiveness 3; 15 seconds 23. Sits doll and bear on chair. Constructiveness 3; 30 seconds 24. Pushes truck back and forth, talking to E about her car. "What is that? Is that a wagon? Where do people sit? There's the father, there's the mother, there's the baby. They can't sit on the wheels, for if the wheels turn they will run over the people." Returns truck to place. Constructiveness 5; 45 seconds
Play	25. "Now, I'll color." Does so. Starts with red. "There's a bag and there's a string to hold it," to E. Talks to self. Shows picture to E. "Now, I'll make something else." Draws with blue — looks at E for some praise. To E, "I've been here such a long time, haven't I? I have been here such a long time, haven't I? There, it's all made!" To E, "What is it? I don't know what it is. Now, I'll make something green. You should know what it should be. There it is. I don't know what." Makes up story about it. "Dolly and little girl go. What color is this?" E says, "Gray." S makes a gray drawing. "I don't know what it is, but I know what this is. It's all made." Constructiveness 6; 285 seconds
Escape?	26. Looks at clock and window, "I've been here a long time." 25 seconds
Play	27. Continues drawing. "This is yellow." E gives her another paper. Child says, "On this side first. There's a big shoe." Explains the parts. "That's the heel and there is the part of the leg." To E, "I haven't made the shoe lace. Here is one. There are the shoe laces." Tells what old drawings are. Looks at observer's window. "I don't know what this is." Constructiveness 6; 235 seconds

Frustration Situation

Strong frustration without play
Po(*Fru*) = .95

1. Barrier is down. Child watches and says, "What do you want that down for?" Then, "Why don't you want me to stay over there?" Is very quiet and sad. Moves very slowly, looking at barrier. Stands near barrier, looks at E, then at house, then to E. Faces E, lifts hand in strange movement; plays with her dress; doesn't say a word for about two minutes. She pouts. 175 seconds

Sudden transition to deep involvement in play without overt frustration.
Po(*Fru*) = .05

2. Sits down at square 2, "collapses." Takes crayons and draws with orange crayon. Says to E, quite pleasantly, "I'm making a dog." Then, "There's its tail." Later, "You don't know what that is, you don't know what that is. I don't want to tell you. I don't want to do any more coloring." Sits looking at work. Constructiveness 6; 180 seconds
3. Takes pegs. Speaks to E about pegs, "What kind of play is that?" Puts row in. Says, "All the greens are going to one line of the greens." Talks to self, "One, two, three, four, five greens." Then later, "I'll count them all; one, two, three, four, five, six, seven, eight, nine, ten — ten greens." Constructiveness 6; 150 seconds
4. Looks at E, and at window, saying, "Is this window open? Is there a screen on it?" 30 seconds
5. "I'll begin on the reds." Takes all the reds and says to herself, "They are the reds, no, they are orange." Chooses the red ones and puts them in peg board. Says, "It will not take me long, I'll bet you." She looks at E and says, "Is there any more red?" E says, "No, I don't think so." Child looks toward barrier and square 3. She says, "Here, look at the start of the orange." She puts a third row and says, "I am afraid there are not enough orange because two orange are already there. It will take me a long time, I bet you." Looks at E, says, "That's the last orange. Now, I know there will be not enough oranges." (meaning not enough to fill out a row.) "Now, there are the purples starting. I am afraid there will be not enough purples." Later she says, "Now the yellows. I wonder how many yellows there will be in the row." Looks at E for a second, and says, "Three more. Three will be out." Then she says, "Shut the box over." Child puts the peg box on top, then removes peg box and says, "I'll bet you it will take me a long time to put them in" (from peg board to box). She takes the pegs from the peg board one by one and puts them into the box. Then she says, "All through," to E. She put the peg board on the peg box and says, "There's the lid, there's the lid." Constructiveness 6; 545 seconds

Strong frustration without play.
Po(*Fru*) = .95

6. Child gets up and says, "Now let's go to school, shall we? I can go by myself. I will open the door." She tries to leave. Child not angry. 75 seconds

Deep involvement in play without overt frustration.
Po(*Fru*) = .05

7. Goes to square 2, takes beads, and piles them. "Here, you watch"; she rolls them. She takes the ring wagon and says, "I have an idea"— then places the beads on the ring wagon; making decorations on wagon with beads. Looks at work. Constructiveness 6; 80 seconds

Irreal substitute
Po(*Fru*) = .05

8. Goes to square 1 near barrier, looking through, acts embarrassed, and says, "I didn't see those orange things there; what makes them stay?" E says, "They are tied on." 65 seconds

Diversions and play

9. She goes to table, sits on chair, and says, "I'll sit on this chair. This is like yours." Looks out window. 60 seconds
10. Examines E's purse and plays with zipper. Describes a purse her mother gave her which she could hold by a strap. Says, "Will not unzip that way; will unzip this way. There is a strapper right there. No, there is none." 100 seconds
11. Finds a red peg and says, "Oh, here is a red. That goes to the red." Stands, goes to square 2, and looks. Constructiveness 1; 25 seconds

12. Goes to table to E. Asks, "Why didn't they change all those toys, but only those?" Walks about talking, with thumb in mouth or biting nails. 65 seconds
13. Sits and looks out window. 45 seconds
14. "I don't want that to get too hot here." She sighs and stands. "I am hot, it's too hot." Sits. "I don't feel anything hot on my shoe. Hmmmmmm! thought I'd put my shoe there, but I was afraid it would be too hot." Finger in mouth. 95 seconds
15. Looks around. 15 seconds
16. Looks at barrier. Walks to barrier, looking at house. Asks, "Where did you get so big a house? How could the big people carry this house inside?" E replies, "One man carried this side, another that side!" Child puts hand through barrier and shows E. She does it again and says, "There, my hand sticks out again." She looks at house and pool. Stands before barrier with fingers in mouth, looking through. 60 seconds.

Frustration
Po(Fru) = .95

17. Says, "It's easy to carry this thing" (chair). Constructiveness 2; 20 seconds

Play without overt frustration.
Po(Fru) = 0.5

SUBJECT 7

Free Play Situation

Sits down and examines and manipulates toys within reach

1. Goes to square 1, sits down; takes iron, manipulates and examines. Takes ironing board; tries to unfold. Irons three or four times on board. Constructiveness 4; 90 seconds
2. Picks up phone, shakes. Looks at E, smiles. Shakes phone. Constructiveness 2; 30 seconds
3. Ironing board examined again; takes on lap; sets ironing board up. Irons on ironing board once. Constructiveness 4; 60 seconds
4. Manipulates teddy as looks about. Reaches doll; places on ironing board. Constructiveness 3; 70 seconds
5. Shakes phone; places to ear; shakes. Constructiveness 4; 30 seconds
6. Picks up frog and duck and places them carefully side by side on floor. Constructiveness 4; 30 seconds

7. Shakes phone. Constructiveness 2; 15 seconds
8. Examines boat. Constructiveness 2; 10 seconds
9. Reaches fish pole; winds string about hand; manipulates pole. Constructiveness 2; 80 seconds
10. Manipulates frog. Constructiveness 2; 15 seconds
11. Moves sailboat. Constructiveness 2; 35 seconds
12. Unfolds paper. Constructiveness 2; 20 seconds
13. Shakes phone. Constructiveness 2; 15 seconds
14. Manipulates frog. Looks about room. Frog carefully placed on floor on line with sailboat. Constructiveness 3; 45 seconds
15. Sail removed from sailboat. Constructiveness 5; 20 seconds
16. Looks at E, laughs. 15 seconds
17. Shakes phone. Constructiveness 2; 15 seconds
18. Boat manipulated. Constructiveness 3; 15 seconds
19. Frog placed on floor. Yawns. Constructiveness 3; 15 seconds
20. Looks about room. 15 seconds
21. Duck moved; sailboat placed on duck; boat pulled by cord. Constructiveness 5; 30 seconds
22. Teddy picked up, examined and carefully placed on floor. Constructiveness 3; 40 seconds
23. Cup and saucer taken in hand; iron, teapot touched. Constructiveness 2; 55 seconds
24. Reaches fish pole; winds cord about hand; puts cord in mouth; stretches cord across nose. Looks at E and is a little embarrassed when E catches her eye. Puts cord about neck and pulls at it absent-mindedly while staring before her. Constructiveness 2; 135 seconds
25. Puts teddy, saucer, cup in basket. Stops, looks fixedly before her; looks at E. Duck, boat, frog, sailboat, phone, placed in basket. Lifts basket; puts basket down. Constructiveness 3; 120 seconds
26. Kneels in center, looks about. 30 seconds

First change of location

27. Hops on hands and knees to square 3. Looks about. Gets truck and pushes it back and forth by her side. Attracts E's attention, gives truck a push to square 2; looks at E and laughs. Retrieves truck, detaches trailer; reattaches. Pushes back and forth by her side. Detaches,

reattaches trailer. Detaches trailer; cannot reattach. Brings truck-trailer reluctantly to E to be fixed. E fixes trailer. Truck placed on floor and pushed to square 1. Constructiveness 4; 445 seconds

28. Places doll on truck and pushes to barrier. Speaks to E in a whisper telling of doll on trailer. Backs truck to square 1; sits talking to E in whisper. Constructiveness 6; 100 seconds
29. Picks up phone. Constructiveness 2; 15 seconds

Frustration Situation

The total frustration situation was composed of one episode. $Po(Fru) = .15$

1. At square 1. Plays with truck and detaches trailer; "Comes off; too bad." Brings to E for help. Smiles at E. Constructiveness 4; 50 seconds

Barrier behavior

2. Looks through barrier. 20 seconds

Play

3. Picks up truck. Constructiveness 2; 15 seconds

Barrier

4. To barrier, looking through, hand on iron. Constructiveness 1; 15 seconds

Play

5. Places iron and ironing board near barrier; irons. "It's hot." Shows E how hot iron is. Constructiveness 5; 30 seconds
6. Puts doll on truck. "Ride on truck." Pushes back and forth, then pulls about in circle. Whispers to self. Pushes truck to barrier, but doesn't look through. Goes along barrier, whispering to self. Looks at E; laughs. Speaks to E. Truck-trailer comes apart, "It's broken." Tries to reattach. "Now it's fixed." Constructiveness 6; 195 seconds

Barrier behavior

7. Looks through barrier as doll is placed on truck. Constructiveness 6; 35 seconds

Play

8. Pushes truck and doll along barrier. Constructiveness 6; 35 seconds
9. Removes doll from truck. Looks at E, smiles. Shows doll to E, and makes doll stand, while explaining to E that doll walks. Constructiveness 4; 105 seconds

Barrier behavior

10. Turns to barrier. Looks through. 25 seconds

Play

11. Goes to square 1; places doll on truck; looks about. Constructiveness 6; 20 seconds

Barrier behavior

12. Looks through barrier; looks at E, smiles. 25 seconds

Play

13. Goes to square 2; speaks to E while taking very little piece of clay. "Mud pie." Slaps clay with palm of hand, smiles. "Pie, pie." Takes very small pieces. Looks about room while manipulating clay. Whispers to herself. Moves to middle of room whispering to E about mud pies. Works with small flat piece, slaps with palm. "Pie, pie." Smiles. "Pie all gone." Constructiveness 7; 275 seconds

Barrier behavior

14. Looks through barrier; speaks about house; sits looking and shifting feet. Whispers. 40 seconds

Play and diversion

15. Back to clay; slaps small flat piece. Whispers about pie. Sticks clay on leg. Puts clay between palms, "Pie all gone." Sits and looks at window. Hears dog, "Doggie bark." Slaps clay again. Talks about pie in whispers. Constructiveness 5; 150 seconds
16. Looks about; yawns; fingers small piece of clay; speaks about pie. Constructiveness 2; 85 seconds

Play

17. Goes to square 3. Picks up boat; cabin removed. Inspects frog, "He's wet." Examines duck, "Duck's wet." Duck and frog placed head to head. Constructiveness 3; 105 seconds

Barrier behavior

18. Looks through barrier. 20 seconds

Play

19. Frog pushed over floor in big circle; duck also. Constructiveness 4; 60 seconds

Barrier behavior

20. Looks through barrier. 20 seconds

Play

21. Carries duck to square 1. Picks up iron and takes it to radiator. Whispers to self. Places iron on radiator; feels iron to see if it is hot. Feels again; again; again. "Get's hot." Smiles. Looks at E; laughs. Constructiveness 6; 140 seconds

Appendix 4

RECORD OF A CASE OF GREATLY DECREASED CONSTRUCTIVENESS IN HIGH EMOTIONAL TENSION

FREE PLAY SITUATION

1. Enthusiastic play from the beginning	1. At square 2 starts to draw. "Look at it," (making lines) "I'll see what I can make," (draws on big square). Names colors which he uses: "purple, pink (laughs to experimenter), brown, white, green, there is a light green, this is a dark green. Isn't it?" (is very interested, involved in play) "I have to see this . . . it is yellow (lies on side, while drawing). Smoke comes out of the chimney here" (pointing to a long line). Makes a few scribbles to try out color. Draws (laughs). Makes blue scribblings, small lines (enjoys it). "That's funny, that there are so many browns. Here is purple. You have got three orange. Here is one orange, here another orange. They are all different colors, aren't they? This is black? You don't have no black? There used to be some black." E, pointing to dark gray: "Maybe this one." Conversation with E about colors. Child: "You thought there wasn't any black." Then the child replaces crayons in box. Has hand full of colors. "Is that a light pink? This is a dark pink, you have some light pink, haven't you?" Continues to replace colors: "It is always supposed to be this way." (Does not put all crayons back.) Constructiveness 6; 540 seconds
2. Diversion and barrier behavior	2. "I am tired putting them back." Walks about, goes to clock wall, then to barrier. "What is there?" E, "There is a room on the other side." 25 seconds
3. Play	3. Goes to square 3. Takes the sailboat in hand. "That is a ship, I know. (Removes sail) "This is a tiny sailboat." Constructiveness 4; 30 seconds
4. Play	4. Goes to square 2. "I'm going to iron." Does a few strokes: Kneeling besides. Constructiveness 5; 25 seconds
5. Play	5. Moves truck and trailer across floor to square 3 to the barrier. "Here it goes." Detaches and reattaches truck. Truck and trailer moved around in circles. Moves truck and trailer making truck noises. Detaches truck. (Is in a good mood.) Looks to observer's window. Truck and trailer moved back and forth. Constructiveness 5; 95 seconds
6. Diversion	6. Goes to observer's window. "Show me how to turn this light on." E pretends to try. Child goes to the switch of the room light, "Why not try this." E explains that it is the switch for the room light. 40 seconds
7. Excited play; much talking; no stuttering	7. Goes to square 1. Examines phone: "What is in here?" E referring to the noise: "It talks there." Child understands: "Doggy there." Shakes phone to make noises. Phone to ear: "Hello! This is not a life doggy? Hello, doggy! Hello doggy!" Shakes phone. "He does not say 'hello.'" Shakes phone: "Hello, doggy!" Shakes phone. "Doggy hello!" Phone placed to ear. Phone placed on truck and trailer, placed to ear again. "What do you want?" Conversation to the E. Hits face with receiver. Shakes phone. Places the phone on truck and trailer. "They have to take the phone with them." Puts phone to ear, "What do you want?" Repeats. "Hello! What do you want? (laughs) He does not want to say 'Hello!' Say, what do you want, you dummy (laughs). I said dummy to the doggy." (Enjoys howling into phone and then putting phone on truck.) Constructiveness 6; 240 seconds
	8. "Here goes the man on the truck. The man is driving the truck." (Tells a story about the man to himself.) Detaches truck from trailer. Puts truck on trailer. "It is going on the bridge. Now he has to take the bridge away." Constructiveness 6; 50 seconds
	9. Phone conversation about the man on the truck. "Do you know they are taking a bridge (laughs)." Then he gives a message. "Now he has to take the bridge away." The truck and trailer is brought to square 3. Puts frog on truck. "Here is a frog. The frog and the duck

have to be taken away." Boat placed on truck. "This is a broken boat. The truck has a lots of things to haul." Hauls to square 1. Removes things: "Say, they all come off." Truck detached. "Now we go on the bridge." Duck placed on trailer. "He has to swim." Truck and trailer reattached. "First the duck takes a ride in the new Dodge. Now they go around to take somebody else too." Takes frog for a ride from the middle of room. Constructiveness 7; 200 seconds

10. Talks into phone. "Hello! What do you want? Hello! What do you want? Hello! What do you want?" Constructiveness 6; 25 seconds
11. Moves truck and trailer with frog from middle of room to square 3. "Now we will get the boat." Constructiveness 6; 35 seconds
12. Talks into phone: "What do you want? Oh! Some different stuff. I don't care, take it to somebody else, to yourself. I don't want it." (laughs) Constructiveness 6; 30 seconds
13. Carries truck and trailer with boat. Constructiveness 6; 10 seconds
14. Talks into phone: "What do you want?" (Shouting very loudly.) "I can't. . ." Constructiveness 6; 10 seconds
15. Then he empties the truck and trailer. "Now they are all back." Constructiveness 6; 10 seconds
16. Moves sailboat and boat. "They are going now. First the duck is taken away on the ship (sailboat). It came to pieces (sailboat came out)." Trys to replace sail. Cabin of the boat placed on sailboat. Then frog placed on sailboat. Constructiveness 7; 110 seconds
17. Puts sailboat on truck and trailer and moves around and to square 2. Sailboat removed. Constructiveness 6; 25 seconds
18. Talks into phone: "Hello! What do you want? (shouts) I said, I have a grand time." Says to E about people in phone, "They are gone." Constructiveness 7; 20 seconds
19. Truck and trailer taken to square 1. Constructiveness 3; 15 seconds
20. Asks experimenter about ironing board. "Will this fold up? This man came to iron." Irons a few strokes. "See Teddy is watching his mother do things." Irons. "Now he is the——." Constructiveness 6; 65 seconds
21. Takes the cup. "He (teddy) asks for supper. I'll pour some tea for him." Pours tea. Drinks and eats from saucer himself. Constructiveness 6; 25 seconds
22. "Now he has to iron. What shall I iron?" Takes pieces of paper and irons. Irons four pieces of paper very carefully, also at the edges. "All through." Constructiveness 6; 150 seconds
23. "And now I'll . . ." Gets truck and trailer to middle of room. "He has to get frog and duck now." Constructiveness 3; 20 seconds
24. Talks into phone, "What do you want? What do you want?" (shouts). Constructiveness 6; 15 seconds
25. Goes to square 3 and puts frog, duck and boat on truck and trailer. "They come back to get these." Truck and trailer pushed around and back to middle of room underneath the ironing board. Constructiveness 6; 40 seconds

FRUSTRATION SITUATION

1. Immediate, strong frustration	1. S stands at barrier, "Why do you lock it? I need the other part of the phone or I can't talk." Walks to window, returns to barrier, moves about, picks up phone. "I want the rest of the phone." Shakes phone. "I want that new teapot." Walks along barrier; walks restlessly about the room. "I have a cup. I need the new teapot." To barrier, "I — I — I — want some water for my cup here," very emphatic. Walks along barrier; turns about. "I want that new teapot." Walks about room rapidly. "We need that teapot on the table." To E's table, "W — W — W — Won't you?" Back to barrier; rattles barrier. "W — W — W — Won't you give me that teapot? W — W — W — Won't you? I — I — I — I say, won't you give me that teapot?" Carelessly steps on toys and bumps into things as he walks about speaking in confused manner and stuttering badly. Drags hand along netting of barrier. "We need — We want — Why won't you —" Loosens collar. "Give — Gi — Gi — Give me — I — I — I want that new teapot. What there is for you to do is to give me that
Stuttering in barrier region	
Restlessness	
Stuttering	
Motor disorganization	
Stuttering	

		teapot (very loudly), 'cause I want it. Won't you? (very explicitly). W — W — Will you give it to me?" Stuttering requests continue. 535 seconds
2.	Stereotyped sentences	2. Goes to E: "Will you give me some water for this cup? Will you give me some water in this cup? Will you give me some water in this cup?" Rests cup right in front of the E, near the face of the E, as the E does not answer the whole time and the child wants her attention. Stutters: "Will you give me the water for the cup?" Touches E. Stutters: "Will you give me the water for the cup?" Touches eyelid of the E. "I want some water to put in here." Stands and waits: "I want some water to put in this cup." Sighs, looks at E. Plays with cup and saucer. Says something indistinguishable. Makes noises with cup and saucer: "I want some water to put in this cup, please (voice insistent)." 95 seconds
	Stuttering	
	Sighs: Incoherence	
3.	Diversion and secondary play	3. Stands in center of room with cup in hand manipulating it. "What are you writing?" Voice calm. 85 seconds
4.	Failure to stutter in barrier region	4. Goes to barrier, "Will you give me some water in here?" Voice calm and appealing. 25 seconds
5.	Diversion and secondary play. Controlled speech	5. To E's table, watches E work; knocks cup and saucer together. "What are you writing?" Voice calm. Touches E's pencil. Constructiveness 2; 65 seconds
		6. To radiator; looks out window. 20 seconds
		7. Looks about room; scratches ear. 20 seconds
8.	Barrier behavior, no stuttering	8. Looks at barrier; "I want you to give me the teapot and some water here." 15 seconds
9.	Diversion	9. Watches E write very intently. 30 seconds
10.	Secondary play	10. Restless play with cup and saucer at E's table; taps table with cup; puts cup under table; knocks cup and saucer together. Constructiveness 2; 35 seconds
		11. Watches E. "What you writing?" 25 seconds
12.	Barrier behavior; no stuttering	12. To barrier, "Please give me some water." Voice ingratiating, calm. 20 seconds
13.	Restlessness;	13. Loosens collar of shirt. Hits table hard with cup

		and saucer. Big sigh. Constructiveness 2; 60 seconds
14.	Barrier behavior; stuttering	14. Walks to barrier. "Pl — Pl — Pl — Please, will you give me some water?" Voice hurt and whining. 20 seconds
15.	Diversion and play	15. Plays at E's table with cup and saucer. Forces saucer through crack in table, has difficulty getting it out. Constructiveness 2; 50 seconds
16.	Restlessness	16. Watches E write; leans on table; stamps with foot. Takes hold of E's pencil, "I'll turn this." 70 seconds
17.	Barrier behavior; stuttering	17. Suddenly turns to barrier. "I — I — I — I want — Will you *please* give me the teapot? I want it *so* badly." Voice very expressive. 20 seconds
18.	Diversion	18. Turns to E, voice calm again, "I'll give you more lead," touches E's pencil. Looks about. 55 seconds
		19. To radiator; examines valve. 10 seconds
		20. To square 1; shakes phone. Constructiveness 2; 15 seconds
21.	Play	21. Picks up truck, carries to square 3; sailboat placed on truck; pushed to square 1. Constructiveness 5; 70 seconds
22.	Diversion	22. Stands, looks about. 30 seconds
23.	Barrier behavior	23. To barrier, looks through, shakes gently. 40 seconds
24.	Play	24. Takes crayon to square 1, sits on chair carefully. Marks on paper. Moves chair carefully, sits down again. Marks, whispering to self. "You have three different kinds of browns;" said loudly and simply. Constructiveness 6; 155 seconds
25.	Escape behavior	25. Gets up, "I am going back to school." Goes to rear door, tries door. 50 seconds
26.	Barrier behavior	26. Returns to barrier, "I want the teapot, then I'll play more. You didn't let me play with the teapot long enough." Pushes against barrier. 15 seconds

Appendix 5

TYPES OF SUBSTITUTE BEHAVIOR

Whether or not a certain activity is a substitute for another activity is frequently rather difficult to determine. Similarity or lack of similarity between two activities cannot be taken as a decisive criterion in one direction or the other (Dembo (12)). An action *A* may be considered to have substitute value (Lissner (58), Mahler (61), Lewin (53)) for the action *B* if the need corresponding to *B* is at least partly satisfied by the execution of *A*. If an activity *A* is attractive because a need for *B* is not satisfied one can say that *A* has "substitute valence" for *B* (Lewin (53)). An activity *A* that has substitute valence for *B* does not necessarily have substitute value for *B*; in other words, *A* may be attractive as a result of the need for *B* but may not satisfy the need for *B*.

The frustrating situations occurring in these experiments provided favorable conditions for the appearance of substitute behavior. Here we have medium high tensions corresponding to needs to reach an inaccessible goal, together with a rather wide choice of other possible goals, some of which may serve as substitutes.

We may distinguish the following types of substitute behavior in the frustration situation.

Real Substitutes

In this case real objects are used in lieu of others which are not available, and they are not used in a way inappropriate to their own real natures. In such cases the tension systems corresponding to the needs for the desired objects and the substitute objects are dynamically very closely related. In the limiting case they may be virtually identical, as in the substitution of a second piece of candy for one which has been dropped in the dirt. An example of this type of substitute from the present experiments is as follows:

Ironing of own dress instead of doll's dress	Subject 5. S sits looking through the barrier. She says, "I guess I'll iron. I wish you had some clothes here." S irons back and forth on ironing board. "Go over and get some clothes for me. Why can't those things come over here?" S continues "ironing." "I'll just iron my own dress." Puts corner of skirt on ironing board and irons it. "Now doesn't that look pretty!" Looks at ironed dress with satisfaction, smiles.

Very few of these real substitutes appeared. It should be recognized, however, that it is extremely difficult to identify such substitutes if verbalization does not take place. It is our guess that many unverbalized, and hence unrecognized, substitutes of this sort occurred.

An example of substitute valence apparently without much substitute value is the following:

Squeaking of phone for squeaking of duck	Subject 8. S sits looking through the barrier with phone in hand. He shakes the phone which emits a noise. S talks to himself and says in a disconsolate voice, "The phone squeaks like the duck, but the duck is not here." (A rubber duck behind the barrier squeaked when pinched.)

Gesture Substitutes

These substitutes involve "going through the motions" and the endowing of actions with "symbolic" significance. They are very common with children and seem frequently to have high substitute value. As Sliosberg (74) has shown, the acceptance of such activities as substitutes depends to a high degree upon whether or not they occur in a play or nonplay situation. "Playing a role," such as going through the motions of housekeeping, is typical for the usual play with accessible toys. We are speaking of substitutes here in case an activity with an inaccessible toy is replaced by "going through the motion," i.e., the child uses a "symbol" of a "symbol."

Gesture with teapot in direction of water behind barrier	Subject 27. S looks about for water for the teapot she carries. Takes teapot to the barrier where she puts the spout through the wire netting, brings it back and "drinks" from the spout. She repeats this several times, smiling after each pantomime.
Fishing through barrier	Subject 13. S, "I want to fish in the pool." Goes to barrier. "Maybe I can fish anyway." Puts fishing pole through barrier, "Look here, I caught a fish."

Pretends, but acknowledges difference from the "real" toy fish

Subject 5. S tries to raise the barrier. Stands looking through. "I'll pretend this is the water." Puts fishing pole through barrier. "Look, I caught a fish." S laughs. "I'll take it off and put it in the boat." Fishes through barrier again. "I'll go back and get some real water and fish." In this case the last sentence makes it clear that the lack of reality of the substitute is well understood by the child.

Substitute Overcoming of the Barrier

These substitutes are closely related to the above in having gesture-like characteristics. They differ in being directed solely at overcoming the barrier. In some cases the child actually takes a toy from his side of the barrier and puts it into the inaccessible area behind the barrier. This action may be interpreted in various ways and may actually have different meanings in different cases. It may be a vague action in the direction of the goal as an ape may throw a stone at a banana outside the cage (Koehler (42)). It may be a means of "communication" with the inaccessible toys. In other cases, the purpose of the action clearly seems to be a demonstration of the child's superiority to, or his independence of, the barrier.

Independence of barrier?

Subject 3. S looks at barrier. He puts the teddy through and reaches toward the big truck. He hits the floor beyond the barrier with teddy. Leaves the teddy on the floor beyond barrier. Gets teddy and brings it back through barrier. "The teddy dropped through, and I got him," is very pleased.

Demonstrates ability to overcome barrier?

Subject 12. S looks through barrier, goes to barrier putting hand through and dropping fishing pole on the other side. "I know how to get it again." Retrieves fish pole.

Demonstration of own power?

Subject 20. Takes truck and trailer to the barrier; backs it along the barrier. Tries to raise the barrier. Puts arm through barrier, turns to E with a mocking grin. "I can still put my arm through, you can't shut up the holes."

Subject 11. Puts arm through barrier and shows to E. "See!" Does it again and again.

In these cases the substitute action is less related to the real goal than in any previous examples. It involves a demonstration of superiority.

Verbal Substitutes

Frequently, substitutes consisted in "verbal manipulation" of obstructed toys. Typically the child would stand looking through the barrier and talking about the toys; no request for the toys would be made, but the child would "examine" them verbally via the experimenter and would "play" with them by stating hypothetical intentions. In these cases the satisfaction was gained on a very irreal level, yet the opportunity for social recognition of the satisfaction seemed to make this type of substitute very effective.

Verbal "manipulation" of inaccessible toys?

Subject 18. S goes to barrier and says, "Oh, see the big goose, the big goose is swimming in the water and says 'quack, quack.'"

Subject 20. To barrier: "It looks like Christmas night. Why do you have to put it (barrier) down?" Holds to barrier looking through. Later, at barrier. "My house is that color." Pleasant voice. "Why will only part of the phone come out?" Stands looking and humming. "Why can't you have everything in the house?"

Detailed discussion of possible actions in the inaccessible toy house

Subject 24. "Do you know what I'm going to do?" Goes to barrier, looks through barrier. "Well, I'm going to sit on the chair." Does so. Rocks. "I wish we could move everything in here. Is the stove electric? Can you cook real food? Where is the real food, and I'll go in and cook it. I could pretend to turn it on and pretend to cook. How could you turn it off? Do you blow it? I wish I were you, then I could play with them all I wanted to. Is it fun? Oh, boy! I wish I could pull the big truck through a hole." (This conversation came forth with great rapidity, with no expectation that her questions would be answered.)

Subject 23. "Look at the little chair in the house. Did you make the curtains or were they in it?"

Subject 20. S looks at tea table. "That thing isn't really hot, is it?"

Looking at the Obstructed Toys

A still more passive action is the gaining of satisfaction by looking at the obstructed toys. This type of "communication"

with the inaccessible toys occurred frequently and in some cases seemed to give much satisfaction, judging from the child's facial expression and the amount of time spent in such behavior. In few cases was there any verbal expression of this satisfaction. One such follows:

> Subject 6. Goes to barrier. "Oh, I can see through here!" Looks through barrier. "That is a very nice play house."

Substitute and Defiance

We finally mention behavior which shows a certain similarity to substitute overcoming of the barrier but which seems to have a somewhat different meaning. It involves removing available toys from the presence of the subject as if they would have a negative valence by throwing them out of reach beyond the barrier. Sometimes this behavior is quite complicated, frequently involving an attack upon the experimenter.

Expression of dislike of an available toy	Subject 24. Child goes to square 3 with the boat. "Why didn't you leave this over there? I didn't want to play with it."
Expression of dislike of an available toy and putting it through the barrier	Subject 4. Takes duck and puts through barrier, saying in a very angry tone, "That too, that too." Puts frog through. "I've had enough here. There now this goes." Child puts boat through barrier. "Why did you do that? Why don't you let me play there. I have got enough of these things. I don't like you. I'll kick you." Subject 4. Puts doll through barrier. "This is going back in." Also puts the bear, iron, cup, teapot, and fish pole through the barrier. Subject 5. "Where's that old truck?" Looks for it. "It's back of me." Gets truck, pushes through barrier. "Now I haven't any car." Subject 23. "I might stick this phone right through here and throw it in the house. But that might break your nose off to see that happening."

These somewhat paradoxical actions by which the child in a situation of frustration deprives himself of some of his available toys could be derived merely from the negative valence of these toys (T). A force ($f_{P,-T}$) away from the negative toys should lead either to a tendency to escape (p. 80) or to remove the toys. In both cases, the distance between child and toys increased.

This interpretation, which technically suffices to explain the behavior, nevertheless, does not seem to be the whole story. There is a note of defiance indicated by the frequent combination with attacks on the experimenter which seem to amount to saying, "I will hurt you by having nothing to do with things you want me to play with."

Probably all of these factors contribute to this behavior in some degree.

Appendix 6

TACTICS TO GAIN SOCIAL CONTROL

The conditions of the experiment gave an opportunity for the exhibition of social tactics on the part of the children. For most children the experimenter was a part of the barrier which prevented them from reaching the inaccessible toys and from leaving the room. Hence, the children were faced with the problem of making a tactical, social approach.

Various types of social approach were observed. Without discussing the problems of emotion and of strength of forces, our analysis limits the consideration to the manner of approach. The situation facing the child in the frustration situation is represented in Figures 18a and 18b (p. 72). The experimenter's powerfield dominates the whole region; if the child can become socially dominant so that his needs determine the behavior of the experimenter, the barrier can be breached through the experimenter. Thus the child is placed in a situation of social conflict. The following techniques of social conflict occur.

Types of Approaches

Statement of Desire.—In these cases there were no elements of conflict, only a statement of the child's desires. The child structured the situation for the adult. He defined the situation, but brought no pressure to bear. This was usually the first step.

> Subject 1. "I want to go in there." Repeated five times. "I want to play with more things."
>
> Subject 2. S carries cup to experimenter. "I want water." Goes to barrier. "In there." Points.
>
> Subject 13. To experimenter's table. "Will you give me some water in this cup?" Repeats three times. Holds cup before experimenter's face, 2 inches from her nose. "Will you give me some water in this cup?" Repeats twice.

A frequent variation of this type of behavior was the stereotyped repetition of such desires.

> Subject 5. S goes to barrier; looks through barrier and at experimenter alternately, saying, "I want a spoon." Repeats nineteen times. Reaches through barrier occasionally. Moves to other end of barrier. Stands looking through and says, "I want that truck," fifty-three times.
>
> Subject 8. Stands by barrier saying, "Let's go in the water," twenty-seven times.

Typically these repeated phrases were spoken slowly, in an expressionless monotone and with a simple rhythm. No great determination was expressed. It was as if the child were caught in a situation from which there was no escape. It has already been suggested that this may be in the nature of restless social movement. In this situation the expression of the desire does not change the situation, as the experimenter does not respond, so the factors which caused the child to make the first statement still operate and cause him to make it again.

Request for Toys.—A request may be considered to differ from a statement of a desire in that the form involves some elements of social conflict and social pressure. Of course, the form of the statement is only one factor in indicating the nature of the psychological situation. With proper emphasis a statement of desire may also be indicative of social conflict.

The request was frequently a second step. A statement of desire on the part of the child may have the purpose of bringing to the mind of the experimenter a cognitive clarification of this aspect of the situation. If this did not produce the desired behavior in the experimenter the request initiated direct pressure. The strength of the pressure varied from the simple, polite request to an emphatic order.

> Subject 3. "Pl—Pl-*please* give me some water here." Voice hurt and very ingratiating. "Will you give me some water in this cup?" Repeats three times.
>
> Subject 27. "Won't you let me play with the big truck? I didn't even have it once."

Request for Explanation.—A frequent early stage in the conflict was an attempt on the child's part to understand the intentions of the experimenter. This frequently meant an attempt to determine the strength of the social barrier. It usually took the form of attempts to get the experimenter to state his attitude.

Subject 20. "Why can't you have it up all the time?"

Subject 26. "Why do the others have to stay? I want that game. Why doesn't the teapot come?"

Subject 30. Goes to barrier. "Looks like Christmas night. Why do you have to put it down?"

Subject 21. "I need to get my swan. Why don't you let me go there?"

Sometimes the time aspect is brought in: Subject 2. "Won't you let me go over there?" E, "You can play here now." S, "When will you?" E, "No more."

Attempt to Influence the Experimenter With Ostensible Reason.—One of the first tactics frequently employed when the conflict becomes serious was an attempt to create in the experimenter a need to have the child enter the obstructed region.

This sometimes involved the attempt to cognitively restructure the existing situation for the experimenter.

Subject 27. "Mr., shouldn't that light be turned off? It might burn out. I'd go straight in and straight out."

Subject 25. S shakes sand off his hands. "I need to rinse this off. Can't I rinse this off?"

Subject 26. S goes to barrier. "Where did you buy them? I can look in, can't I? Why don't the boats float? The duck and the fish don't go. I have to go and make the bed. The doll will get cold without covers."

Subject 18. S, "You should have let me play a little longer. Say, it might sprinkle here. I'd better get the cardboard house" (repeats twice).

At other times the child actually changed the field in an attempt to create a situation where the experimenter would have to lower the barrier.

Subject 3. Pushes truck to barrier and deliberately puts it through and drops it on the other side. "I want to get the truck." E lifts barrier slightly so child can retrieve the truck. Immediately when barrier is lifted the child says, "Oh, I want over here. I want over here. I want the big truck."

Subject 21. Hauls toys to barrier on truck, singing most of the time. "I'm taking them over the fence. Now, there it bumped." Puts things by barrier. Sings, "The truck will go right through. The truck will go right through." Indicates hole. Lifts truck and pokes it through the barrier. "Hey look, he's going to go through. Look, he's hanging!" S comes to E's table. "He needs help to get out. He's trying to get out." E rescues truck and gives to child. "Oh, I thought that maybe—I thought you'd—." (Implication was that E would have to raise the barrier.)

When attempting to escape and return to the nursery school the child would sometimes try to involve the sympathies of the experimenter.

Subject 11. "I'm waiting for you and I'm getting tireder and tireder. I get too tired to stand here." E, "You can sit down." Child laughs. "I like to stand! Let's go now. I have some work to do."

Subject 21. "I want to go 'cause it's too hot in this room."

Threats.—Sooner or later many children resorted to threats of one sort or another against the experimenter.

Threat of nonco-operation: Subject 22. At E's table watching E work. "I'm not coming over here any more! It's not me coming any more. I'm going to the other side. I'm going home. I've had enough of this business."

Threatens with attitude: Subject 8. "My daddy won't like you any more."

Unspecified threat: Subject 27. "The next time can I play with that?" E, "No." S, "You might as well be quiet or shut your mouth. I'm going to get that truck, or I'll——."

Assault.—In some cases the child resorted to direct action to enforce his desires upon the E.

Interference with experimenter's activities: Subject 25. Goes to square 1. Picks up phone and strikes it. Brings phone to E. "How do you do this? I can't make it go." Shakes phone. "It says, 'Hello.'" Knocks phone on table. Hits E's paper; prevents him from writing. Does same again and again.

Subject 5. Goes to E's table, "Don't write, don't do that. I won't let you write." Puts hand on E's paper. Repeats orders not to write.

Assault on experimenter's property: Subject 12. "I don't like you." Climbs on radiator. Looks at E. "Now hush up," very mad. Takes E's pocketbook, opens it. "I want a nickel."

This analysis does not do justice to the subtlety of the social control shown by many of the children, inasmuch as this is exhibited largely in the nature of the shifts from one tactic to another. The following case illustrates these factors:

Example Illustrating a Sequence of Tactics.—Frustration Situation: Subject 27.

During the first part of the session the subject appeared to be exploring the situation and testing out the strength of the social barrier.

1. Trying to get clear about situation	1. While E pulls barrier down and locks it, S sits in chair watching and rocking. As E turns from barrier to his table, S says, "Won't you let me go over there?" E, "You can play here now." S, "When will you?" E, "No more." Constructiveness 2; 65 seconds
	2. S takes teddy and doll and places them on ironing board, still sitting on chair. Constructiveness 2; 55 seconds
3. First tactic; test of strength	3. S goes to square 2; looks through barrier; "Will you let me go over there soon? E, "No, not again." Picks up truck and examines it. "Well, can't I go over and close the door of the big truck and wipe up that water on the floor that I spilled? Was all that there the other time?" Constructiveness 2; 60 seconds
	4. To square 1. Begins to play with pegs. "I guess there will be enough this time." Places pegs; glances at barrier occasionally; sings to self. Constructiveness 5; 25 seconds
5. Attempt to clarify situation	5. Continues placing pegs. Talks to E while working, "The next time can I play with that?" E, "This is the last time you will come." S, "You might as well be quiet or shut your mouth." Sings very loudly and raucously as continues placing pegs. Constructiveness 5; 95 seconds

There next occurs a period of overlapping barrier, escape and play regions. The barrier appears to be impassable. Some attempts to cover his predicament from experimenter.

	6. Goes to E's table and asks for sheet of paper. Returns to square 2. 25 seconds
7. High motor tension	7. Places pegs again. No selection of pegs. Sings with abandon. "I'll put the sharp end up." Constructiveness 5; 50 seconds

	8. Goes to window; looks out. S, "Whose house is that?" 30 seconds
	9. Back to pegs. Sings offensively, senseless silly words as works completing a square. Glances at barrier occasionally. "Only two more and that's all," announces very loudly. Constructiveness 5; 75 seconds
	10. "Now I'm going to do some coloring." Reaches behind and colors behind his back. Breaks crayon in half. Scribbles behind him. Constructiveness 5; 65 seconds
11. Attempt to escape	11. Goes to rear door and pulls very hard; shakes and rattles the door. 20 seconds
	12. Returns to coloring. Breaks another crayon before continuing. Colors very carelessly. Sings senseless words loudly. Takes second sheet of paper. Hums as he works very rapidly. "Look, isn't it pretty?" E, "What is it?" "Oh, I don't know." Seems to be really interested in work. New sheet; scribbles; sings. "Can I take this home?" Constructiveness 5; 245 seconds
13. Repeat of feeble tactic	13. Takes drawings to E's table. Stands looking at E's work. "'Won't you let me go over there and straighten up?" 40 seconds
	14. Takes clock cord in hand; manipulates. 20 seconds
15. Social attempt to escape	15. Gets fish pole from square 3. Returns to E's table; looks out window. "Won't you let me go back (home) now?" Constructiveness 1; 50 seconds

There follows an aggressive approach, a new tactic of overpowering social and physical barrier.

16. Attack on physical barrier; partly to impress E	16. "I'm going to lift this up." Goes to barrier. Pushes, pulls barrier with great energy. Shakes and kicks barrier; breaks a corner of barrier. 135 seconds
17. Appeal to sympathy	17. To E's table. "Won't you let me play with the big truck? I didn't even have it once." Voice very pleading. 40 seconds
18. Attack on E	18. Takes pencil from E's pocket. "I'll take your pencil." Screws leads from the pencil trying in every way to annoy E. 70 seconds
19. Attack on E	19. Goes to chair; sits and rocks. "Won't you give me one of these chairs? Won't you now? How much did they cost? About a dollar? Won't you give me a dollar so my father can get me one?"

	Teasing, mock-serious voice. Constructiveness 2; 50 seconds
20. Motor tension	20. Picks up phone and shakes it very hard. Walks to window shaking phone. "What is here to make it squeak?" Constructiveness 2; 100 seconds
21. Climax of attempt to rush the E directly	21. "Won't you let me have the rest of the phone? Why?" Voice very appealing. Runs to barrier; knocks phone against barrier. "Won't you let me go and try the windows?" Shakes phone very hard. Pulls up on barrier; tries to stick phone through. "Please let me run that truck; I didn't have it. You let me now, or I'll reach in and get it." Tries to reach truck with phone. "I tell you to let me, or else I'll break this (barrier) down. You let me, I tell you." 145 seconds
Continuation of social approach tactics.	
22. "Intimate" social pressure	22. Returns to E's table. Leans toward E in very confidential way, "Mister *please* let me; when can I go?" 55 seconds
23. Offering "Deal" and Threat	23. Walks about room shaking phone. Sits on chair; shakes phone. Speaks in matter-of-fact voice, "If you'll let me have that truck, I'll—" Gets up in aggressive manner, "I'm going to get that truck or I'll—" Rushes to barrier, pulls and shakes. 45 seconds
24. Trap	24. To E's table. "Mister, shouldn't that light be turned out? It might burn out. I'd go straight in and straight out." 40 seconds
	25. To barrier. Loud and rough scraping of phone on barrier. "I tell you I'm going to get it; if I only had something long." 35 seconds
26. Appeal for sympathy	26. Turns to E. "Please, please—"; very plaintive voice. 15 seconds
27. Threat	27. "You let me, or I'll—." Begins to climb up barrier. 45 seconds
28. Personal touch extreme ingratiation	28. Turns back to E in very friendly manner. "Won't you please let me have the truck?" Leans against E in affectionate manner. "Please, Mr. Bark, please Mr. Bark." To barrier and returns climbing up in E's lap, "Please Mr. Bark, let me have the truck. I want it. Won't you, Mr. Bark?" E, "You have lots of things here." Gets down and climbs up again, "No, I haven't." Puts cheek against E's face, "Please, please Mister give me the truck." 200 seconds

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