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TITLE OF THESIS...TOWARD A THEORY OF PERCEPTION: PARTICIPATION AS A FUNCTION OF BODY-FLEXIBILITY

UNIVERSITY...O.F. ALBERTA.....

DEGREE FOR WHICH THESIS WAS PRESENTED..PH.D.....

YEAR THIS DEGREE GRANTED.....1971.....

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DATED...Dec. 8.....19 70.

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THE UNIVERSITY OF ALBERTA

TOWARD A THEORY OF PERCEPTION: PARTICIPATION AS A FUNCTION OF BODY-FLEXIBILITY

by

© BRUCE CAMPBELL BAIN

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

SPRING, 1971

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Toward a Theory of Perception: Participation as a Function of Body-flexibility" submitted by Bruce Campbell Bain in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

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ABSTRACT

The main purpose of this study was to present a tentative statement of a theory of perception in which the role of the body was emphasized. The relationship of the body to the perceived world was conceptualized in terms of a dynamic body-schema, the extent and flexibility of which was termed body-flexibility. This hypothetical construct, i.e., body-flexibility was seen as emerging in ontogenesis along a developmental continuum from immature to mature. The immature perceiver was conceptualized as embedded in a world, with minimal polarization of his body and his world, with minimal consciousness of his body-as-subject and body-as-object of experience. The mature perceiver was conceptualized as having the ability to distantiate, i.e., as conscious of his subjective and objective poles of being in relation to the phenomena of experience. The ability to distantiate was conceptualized in terms of degree of body-flexibility. The language and constructs of this statement were mostly distilled from the works of Church, Merleau-Ponty, Piaget, Schachtel, Schmidt, and Werner.

The phenomenon of perception addressed to, from the framework of the construct of body-flexibility, was participation. The literature on this phenomenon under its kindred names: Einfühlung, physiognomic perception, etc., was reviewed. An analysis was made of the assumptions underlying the "rôle-taking", projection", "Gestalt", Schachtel's "kinesthetic empathy", and Lévy-Bruhl's and Piaget's "participation" approaches to the phenomenon. A major issue in the literature is

whether participation increases or decreases in ontogenesis. The general hypothesis of this study was that participation increases in ontogenesis as a function of body-flexibility.

Body-flexibility was operationally defined in terms of trials to fixation and to extinction of the Uznadze kinesthetic and visual illusions, which were designated kinesthetic and visual body-flexibility tasks. Participation was operationally defined in terms of scores obtained on four tests: expressive lines, expressive faces, portrait sensitivity, and interview situation. The sample consisted of 48 children, 12 Ss per 5-6, 7-8, 9-10, and 11-12 year-old groups, and 38 adults. The general trend of the results showed an increase in body-flexibility with age, an increase in participation with age, and the level of performance on the tests of participation could be predicted from the level of performance on the body-flexibility tasks. Some conceptual and operational problems, and future research designs to help clarify certain issues were discussed. It was concluded that, although the general hypothesis was significantly supported, the construct of body-flexibility required further refinement.

A minor study concerning Piaget's use of the law of relative centrations to interpret his Uznadze illusion findings was also conducted. The results suggested that the law may not be universal. A second minor study explored the feasibility of using an imaginal task to evaluate the degree of body-flexibility. The results were seen as possible evidence for Werner's principle of orthogenesis, but provided inconclusive support for the construct of body-flexibility.

ACKNOWLEDGEMENTS

To Freda Bain qui l'a mis en marche

To John and all the Bain boys and their families for their support

To Jay Bishop for his confidence

To Joseph Church whose book became my Bible

To Barnard Corman for the Dissertation Fellowship

To Richard Frucht for his alternatives

To Manjuli Gon who explained it to me

To Metro Gulutsan a learned man and helpful friend

To John Hritzuk for his concern

To Richard Lapensée nous allons ensemble

To Rémi Mayrand qui a fourni l'élément essentiel

To George Nakamura the dependable friend

To Rose and Norman Petch for their help

To George Price who asked the questions

To Wilfred Schmidt my genial Guru who never flagged throughout this thesis, his inspiring lectures taught me, and many others, what psychology could be about

To Joseph Zweig my undergrad Prof. who remains concerned about his former charges

To Omar el Halawani, William Kline, and Judy Wiener the indefatigable Judges

To the residents of Michener Park who are also a cooperative population

To the many students, professors, librarys' staff, and administrative workers of Sir George Williams, McGill, Montréal, and Alberta Universities who contributed in innumerable ways

To the anonymous non-members of the No Name Club for their reasoned debates

Especially to Donna Bain Who gave of Self
and asked not
but to Share

To all of you, individually, and collectively, Thank you,

Je vous en apercevoir.

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> Every man lives a twofold life: on one side is his personal life, which is free in proportion as its interests are abstract; the other is life as an element, as one bee in the swarm; and here a man has no chance of disregarding the laws imposed on him.
>
> Tolstoy, War and Peace

THE PROBLEM

The path from our home to our garden may be quite familiar to us. We walk along it confidently and casually, knowing what to expect at every turn. Gradually the feeling comes over us that something has changed. Anything that changes from our expectancy of it is felt by us as a disturbance before we are fully conscious of what it is that changed. Perhaps we succeed in discovering what the change consists of; and, perhaps for the first time we even notice what kind of thing it really was that now has changed. In an instant we reconstruct how it looked before and compare it with how it looks now. We realize that that thing we thought to be an ugly weed has turned out to be a beautiful flower. As we stand there enjoying this serendipitous event we experience ourself thinking: "won't this look lovely beside the rose bush—I'll rearrange the garden so;" as the full scene saturates our consciousness. Then we experience ourself thinking: "but to do that some other flowers will also

have to be transplanted—I have too many other things to do—I'd better leave the rearranging 'til another day." We note the changed conditions and carry on down the path.

In somewhat oversimplified, stretched-out, and prosaic terms I have been describing the two kinds of perception available to us, the participative and the contemplative, and the two modes of functioning of the human body, the subjective and the objective. Let us look at these phenomena in the more formal language of psychology, and focus on the particular problems to be investigated. Church puts it this way:

> We can recognize two major kinds of perception, each of which has a mature and an immature version, and each of which represents a way of being mobilized toward reality. The first kind is what we call participation, where we respond organismically in an unmediated, reflex-like way to the dynamic, affective, physiognomic properties of the environment. The second is contemplative perception, where action is suspended in favour of inspection, judgement, and analysis.[1]

The primitive perception is a participation in a meaningful expression of our behavioural field—a cry—the mature perception is contemplation of the object in our behavioural field--that child is crying. The grasping of the expression is to contemplation as the cry is to words.[2] Both are modes

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[1]J. Church (Vassar Coll.), Language and the Discovery of Reality, p. 49. The footnote format is per Psychol. Abstracts.

[2]L. Vygotsky (Acad. Ped. Sc., Moscow), Thought and Language, p. 153. "A word is a microcosm of consciousness."

of cognition that reflect reality in different ways. Participation in the expression is for me, contemplation of the object is for us. Participative mobilization is in terms of expressions in the behavioural field that are meaningful to the perceiver; that is, where the perceiver responds in a more-or-less unmediated way to the physiognomic meaning-qualities (i.e., to the expressions) of his behavioural field. Contemplative mobilization is in terms of a culturally shareable consciousness; that is, where the perceiver's responses are mediated by his cognitive categories of thought.

Church suggests a developmental continuum from immature to mature in both kinds of perception.[3] Church, and others,[4] present considerable conceptual and empirical evidence in support of this notion with respect to contemplative perception. However, the extent to which participative perception follows a similar or divergent ontogenetic pattern remains an open question at this point.

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[3]Church, op. cit., p. 49, notes that "the distinction of immaturity-maturity that cuts across these two kinds of perception (which themselves are developmental in nature) is in terms of relativism and egocentrism, of the varities of attributes accessible to the perceiver, of the degree of schematization and consequent stability of perception and flexibility of action, of the extent of ego-differentiation whereby feelings are internalized and object properties objectified, and of abstractness and concreteness." Church's analysis of these distinctions are being assumed in this thesis.

[4]Church, op. cit., and Vygotsky, op. cit., have bibliographies of works in this area.

Piaget[5] for example suggests that participation ceases to function as a distinct mode of perception following the development of reversible schemas. If we can equate Piaget's terms "perception" and "perceptual activity" with participation, and "operations" with contemplation, then it is clear that according to him contemplative perception becomes dominant with cognitive development. Hence one question to which this thesis is addressed is:

> What is the nature of the development of participative perception? Does it increase in ontogenesis? Or does it decrease in ontogenesis?

"BODY-FLEXIBILITY", A HYPOTHETICAL CONSTRUCT OFFERED AS AN EXPLANATION FOR PARTICIPATIVE PERCEPTION

Schutz notes the essence of participation and contemplation, and the two modes of functioning of the body:

> In listening to a lecturer we seem to participate immediately (à la Lévy-Bruhl) in the development of his stream of thought. But—and this point is obviously a decisive one—our attitude in doing so is quite different from the one we adopt in turning to our own stream of thought by reflection. We grasp the other's thought in its vivid presence and not <u>modo praeterito</u>, that is, we catch it as Now and not as Just Now. The

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[5] J. Piaget (U. Geneva), <u>Play, Dreams, and Imitation in Childhood</u> (1951); also, J. Piaget (U. Geneva), <u>The Mechanisms of Perception</u> (1969).

> other's speech and our listening are experienced as a vivid simultaneity.[6]

Schutz goes on to develop the point that the attitude we adopt toward others is considerably different in emotive content from the one we adopt toward ourself; an issue which need not concern us here. The important point for our purposes is that the attitude Schutz refers to is but one mode of consciousness. Another mode, and the one that does concern us here, is that we can (and here I will use Schutz's terminology), adopt specific attitudes toward our subjective and objective poles of being, designated in this thesis as body-as-subject and body-as-object. Let us look at some examples of this latter mode of consciousness.

We observed the gardener thinking: "I'll rearrange my garden so." In this mode he was relating to himself as the subject of the experience; as someone who was sensitive to the regularities of the path; as someone who participated in a meaningful expression; as someone who created a scene of greater beauty in his imagination, a scene more commensurate with his "inner" valuing; as someone to whom time was an open system. We also observed him thinking: "I'd better leave the rearranging 'till another day." In this mode he was relating to himself as the object of the experience; as someone who was sensitive to his other needs; as

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[6] A. Schutz (New School Soc. Res., N.Y.), Collected Papers, Vol. I (1962), p. 172.

someone who decided that other things more commensurate with his "external" valuing were more pressing; as someone who directed himself elsewhere; as someone to whom time was a closed system. As you read this page you are the object of my words. At the same time you can be conscious of yourself as the one who is reading the words, that is, as the subject. Moreover as you read this page you are probably not conscious of your shoes being full of your feet—though you probably are now—as your feet become the object of your consciousness. As you oscillate back and forth, experiencing your feet and alternatively, experiencing that experience, you are relating to yourself alternately as subject and as object.

This kind of experiencing of the body does not seem to be limited by the boundary of the skin. Schilder[7]

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[7] P. Schilder (Columbia U.), The Image and Appearance of the Human Body (1935), p. 15; cf. J. Piaget and J. Maroun (U. Geneva), Recherches sur le développement des perceptions; XXXIV. La localization des impressions d'impact dans la causalité perceptive tactilo-kinesthésique. Arch. Psychol. Geneve, 1957, 36:202-235. Piaget and Maroun found the delegation effect ("impression delegation"), as they call it, to increase in frequency with age. They interpreted their results as being due to increased effectiveness in decentering in ontogenesis. It may be suggestive of other than a decentration explanation if it was found that the course of development of blind persons follows a different pattern--which it may do. It seems likely that a blind person can identify certain objects and textures of objects via the extension of his body-schema (i.e., his cane), and, if this be the case, then the assumed operation of reversing a schema in order to decenter becomes a less potent explanation of the delegation effect. Because the question now becomes: How does a blind person come to decenter from a single perspective of an object when his experience of the object is by necessity, in Piaget's terms, a centration experience?

suggests that the clothes we wear, the tools we use, are assimilated to and become extensions of our experienced body. For example when we touch the ground with a walking cane we feel it at the end of the cane, not in the hand. Nor is it limited to any specific member of the (physiological) body, sensory modality, or active-passive dimension of bodily activity--though I expect the latter would be a graded dimension. Gibson notes:

> The fact seems to be that in touching or being touched by a solid object anywhere on the body one can attend to either the external resistant thing or to the impression on the skin. The reader should try it. Within limits you can concentrate either on the edge of the table say, or on the dent it makes in you. It is as if the same stimulating event had two possible poles of experience, one subjective and the other objective.[8]

Merleau-Ponty,[9] who seems to share few of Gibson's cautionary injunctions, affirms that this dialectic-like phenomenon is the typical form of communicative transaction at all levels of body functioning, and is not just limited to the higher, imaginal, introspective levels. Merleau-Ponty gives an example from what he calls the lower levels of consciousness with a description of haptic and visual knowing. The example is quoted from Kwant,[10] and is

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[8] J. Gibson (Cornell U.), The Senses Considered as Perceptual Systems (1966), p. 99.

[9] M. Merleau-Ponty (U. Paris), Le Visible et l'Invisible (1964), pp. 170-180.

[10] R. Kwant (U. Utrecht), The human body as the self-awareness of being, Humanitas, 1966, 2:43-60.

reported in the language of the authors. As lucid as the description is, the authors unfortunately use certain terms that have other meanings in psychological terminology. Note that "real reflexivity" and "attitude" are akin to "Uznadzean Set"[11] or to "schema",[12] depending on one's preferred terminology and interpretation of the phenomenon in question. The example:

> There is consciousness in the body itself. In my touching I am aware of my touching; otherwise how could I adapt the movement of my hand to the thing I am going to touch. Merleau-Ponty points out that consciousness is part of the real reflexivity of the body. The significance of which he reveals to us in an analysis of grasping and feeling things. Our hand assumes a different attitude when it is going to feel the softness of a pear, the quality of a cloth. It is interesting to observe the different attitudes of our hand. The attitude of our hand is adapted to the thing we are going to grasp or feel. The right attitude conditions the effectivity of our grasping and feeling. The thing we are going to

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[11] See S. Sodhi (U. Alberta), Soviet models of behaviour-reflex and set, in, M. Gulutsan and H. Steinmetz, eds., Papers on Soviet Psychology (1967).

[12] See R. Oldfield and O. Langwill (U. Oxford), Head's concept of the schema and its application in contemporary British psychology, Brit. J. Psychol., 1942, 32:267-286; 33: 58-64; also, note Church's, op. cit., p. 36, definition: "Stated logically rather than psychologically, a schema is an implicit principle by which we organize experience. Psychologically, the schema has two faces. On the environmental side, we become sensitive to regularities in the way things are constituted and act, so that we perceive the environment as coherent and orderly, in ways that the adult can make explicit as principles but that, for the baby, exist only in the sense that here is the world and things are under pretty good control. On the organismic side, schemas exist in our mobilizations to act and react which in turn reflect the environmental properties to which we (like the gardener) are sensitive."

> grasp or feel teaches us the attitude we have to assume. By assuming the right attitude we give the things a chance to become touchable for us. We do not assume the right attitude in light of reason. We usually do not even know the attitude of our hand. Our touching and feeling hand often corrects its own attitude in touching and feeling itself. We could not do so if we did not feel our feeling hand. This feeling of our own feeling belongs to feeling itself, and it is, therefore, part of the real reflexivity of the body itself. Similarly with seeing, we can see things because we move our eyes in the right way, the movement of our eyes conditions our vision. We do not move our eyes in light of our ideas. We usually do not even know that we move our eyes. Our body moves its eyes in the right way, in a dialectic interchange with the things we are going to see.[13]

The above examples point to the fact that we experience our subjective and objective poles in different sensory modalities, areas of concern, and levels of consciousness. There

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[13]Kwant, op. cit., p. 51. Many writers would be hesitant to refer to activity at this level as being conscious. They would prefer to rest with the axiom that all organisms are self-regulating and what is being referred to here is an example of self-regulation. Merleau-Ponty concurs with the axiom but insists that it is not just a case of self-regulation because we can intervene and change the direction of the behaviour on a number of levels. For example, if in writing our pen becomes uncomfortable, we can change the position of the pen while focusing on something else. We do not have to raise the level of the consciousness of the pen in order to direct ourself to change the position of the pen, the body itself changes the position of the pen. But we can also, at a higher level direct ourself to change the position of the pen. Both are instances of conscious activity according to Merleau-Ponty, the difference is one of level. Cf. E. Hilgard (Harvard U.), Levels of awareness, in, R. MacLeod, ed., Wm. James: Unfinished Business (1969), pp. 52-55; J. Piaget (U. Geneva), The Judgement and Reasoning in the Child (1929), pp. 145-146; D. Uznadze (Georgian Inst. of Psychol., Acad. Sc. Georgian S.S.R.), The Psychology of Set (1966), pp. 36-39; and K. Goldstein (1148, 5th Ave., NYC), The Organism (1959), pp. 307-335, for their views on the levels of consciousness issue.

is also an intrinsic coherence between these experiences. For example, when we touch an object which is different from our expectancy of it, our eyes immediately turn to the object and our vision informs us about the touchable qualities of the object. The something that supplies this intrinsic coherence, for the purposes of this thesis, is the "body-schema".

Merleau-Ponty notes the essence of this psycho-biological construct:

> If my body is to appropriate the expressions given to me and make them its own it must itself be given to me not as a mass of utterly private sensations but instead by what has been called a 'postural-' or 'corporeal-' or 'body-schema'. My body is no agglomeration of sensations (visual, haptic, cenesthetic). It is first and foremost a system whose different interoceptive, exteroceptive, and proprioceptive aspects express each other reciprocally, including even the roughest of relations with surrounding space. The consciousness I have of my body is not the consciousness of an isolated mass; it is a body-schema. It is the perception of my body's position in relation to the vertical, the horizontal, and other axes of its world.[14]

In other words, not only is our body itself a "system of functionally equivalent sensory modalities,"[15]

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[14] M. Merleau-Ponty (U. Paris), The child's relation with others, in J. Edie, ed., The Primacy of Perception (1960), p. 117.

[15] H. Werner and S. Wapner (Clark U.), Toward a general theory of perception, Psychol. Rev., 1956, 59:324-338. As with Merleau-Ponty's concept of the body as an integrated system, these authors speak of functional equivalence with respect to sensory-tonic states. Whatever the terminology, the idea is that any neuro-psychological entity is neither sensory nor motor but a dynamic process prior to both, it may be effected similarly through the receptors, as well as by direct stimulation of the muscles.

but our consciousness of it, or our perception of it, is in terms of a holistic body: world relationship. Werner and Kaplan state it this way:

> Every behavioural act, whether outward bodily movement or internalized cognitive operation, gains its significance and status in terms of its role in the overall functioning of the organism, and any local organ or activity is dependent on the context, field or whole of which it is a constituent part: its properties and functional significance are in a large measure, determined by this larger whole or context.[16]

The consciousness of the body then is not the consciousness of two heterogeneous worlds in some Descartean sense. Rather it is the consciousness of the body in terms of the expressions of the world; and the opposite, the consciousness to the world is in terms of the expressions of the body. It is this type of reasoning that allows Merleau-Ponty to say that: "The theory of the body is already a theory of perception."[17] By this he means that:

> . . . every external perception is immediately synonymous with a certain perception of my body, just as every perception of my body is made explicit in the language of external perception.[18]

Whether the object of perception is "out there" as part of the external world, or "in here" as part of the perceived body, this relational dialectic of body:world is always

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[16]H. Werner and B. Kaplan (Clark U.), Symbol Formation (1963), p. 3.

[17]M. Merleau-Ponty (U. Paris), The Phenomenology of Perception (1962), p. 203.

[18]Merleau-Ponty, The Phenomenology of Perception, p. 206.

operative. Wapner and Werner state it this way:

> . . . there can be no perception of objects 'out there' without a bodily frame of reference, and, conversely, there can be no perception of the body-as-object without an environmental frame of reference. In all cases the variability or stability of the psycho-biological unit 'body: world' reflects itself in body perception as well as object perception.[19]

The basic assumption of this thesis is that the perception of expressions in the behavioural field is a function of the extent and flexibility of the body-schema. (For convenience we shall use the term "body-flexibility" to refer to extent and flexibility of the body-schema.) If consciousness is primarily directed toward the world, turned toward things, and is above all a relation to the world, and if Werner's and his associates' empirical findings are sufficient support of this assumption, then it follows that to the extent that we can discover and actualize a better organized experience of our body, and to the extent to which we can elaborate and create a more flexible body-schema, the expressions in our behavioural field will become readily perceptible to us. Before highlighting the development of the body-schema, let us look at some examples of the interrelatedness of the body-schema and the development of the kind of perception we are calling participation.

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[19] S. Wapner and H. Werner (Clark U.), An experimental approach to body perception, in S. Wapner and H. Werner, eds., The Body Percept (1965), p. 10.

To begin with, the type of conceptualization being developed here is made comprehensible only if we add to the relatedness feature of the biopsychological unit "body: world", a seemingly contradictory, but actually complementary feature, viz., degree of articulation (or polarization) between body:world. In other words, ontogenesis begins in a state wherein the neonate does not distinguish between his body and the surrounding world. He is fully "embedded"[20] in the surrounding world, the boundary between his body and the world is not yet defined. The body-schema is something he actualizes in development as he pulls himself out of this embeddedness and comes to know himself in relation to his world—a process which I doubt is ever fully realized even by the most mature of persons.[21]

While in this state of embeddedness, infants are nevertheless sensitive to certain expressions, for example to facial expressions. According to Spitz[22] some infants will mobilize to a smile as early as two months, and most infants will do likewise by six months. The physiognomic expression signals significance for the infant, and he

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[20]This term is being used as per E. Schachtel (William Alanson White Inst.), Metamorphosis (1959).

[21]For an analysis of the nuances of this issue see A. Maslow (Brandeis U.), Toward a Psychology of Being (1962).

[22]R. Spitz (Ft. Logan Mental Health Cent., Colo.), The First Year of Life (1965). There is an interesting analysis of Freudian and Piagetian constructs in this book.

responds in some more-or-less diffuse manner. But the infant has no experience of his body as an acting agent at this stage. Spitz puts this notion in psychoanalytic terms: "During this stage the infant is aware of certain meanings in the external world, but he has no experience of his ego as a functioning entity."[23] In our terms he has no experience of his body-schema, he is fully embedded in the surrounding world and is "lost in the organic sensation."[24] The key question becomes: What expressions does the infant mobilize to at this end of the assumed continuum if he cannot perceive himself in relation to the expression? Church supplies an answer:

> Those objects, and those properties of objects, stand out which offer some relevance to the infant himself, in terms of promise or threat or concrete action. Those things which are meaningless seem also to be beyond perception. The infant is oblivious to the screaming sirens of the fire trucks that go racketing past, to the clamor of the telephone or doorbell; but he may wail in distress when his mother sneezes in the next room. Here we are saying two things: that the infant perceives only personally meaningful objects, and that what he

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[23] Spitz, op. cit., p. 90.

[24] W.H.O. Schmidt (U. Alberta), The Educational Development of the Child (unpublished manuscript), p. 102. Schmidt speaks of cognition as "being possible on the basis of 'talking distance', or of 'distantiating' one's self from the object of awareness . . . . 'Distantiating', in this context, means not being lost in organic sensation or not being at the mercy of emotions or under the compulsion to act and react only."

> perceives is not so much the objects as their meanings.[25]

As efficient as this kind of perception may be for the infant's purposes of knowing reality,[26] it remains bound to those meanings "of promise or threat or concrete action" until his developing body-schema extends the range of the expressions in the world that he can participate in. The continuity and the increasing range of expressions that the emerging child can participate in is best likened to a spiraling circle: from the center where participation is in terms of significance to the organism, to the gradually increasing and rising outer edge where participation is also

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[25] Church, op. cit., p. 5. The remainder of the passage reads: "Developmentally and microgenetically meanings precede objects in perception. As Flavel and Draguns have noted it is this principle that enables us to understand 'subliminal perception', the fact that we can react to something without being able to identify the something to which we are reacting."

[26] Some readers may hedge at granting an infant the ability "to know". But knowing at this stage (and the same holds true microgenetically as well as developmentally), like Merleau-Ponty's insistence on consciousness in the body itself, is as much a problem of terminology as anything else. Whatever the terminology, the basic idea is that the organism is itself directed toward knowing. (See note 30). This directedness is an inherent condition of all organic life; a condition that changes quantitatively and qualitatively following the discovery of language; but it is nevertheless a potential of organic life. If this basic idea smacks of teleology, that is because that is what is being suggested. But it is an objective teleology in that it is observable in organic life. Cf. L. von Bertalanffy (U. Berlin), An Introduction to General Biology (1934); Sir Julian Huxley (U. Oxford), Essays of a Humanist (1964), esp. "Higher and Lower"; G. Miller et al. (Harvard U.), Plans and the Structure of Behaviour (1960), chap. 3; L. Frank (25 Clark St., Belmont, Mass.), On the Importance of Infancy (1966), pp. 53-63; and Goldstein, op. cit., p. 335, et passim., for their views on the inherent directedness in organisms.

in terms of culturally shareable expressions, there is continuity yet a vast difference from the relatively amorphous center to the relatively independent outer edge. The continuity and the differences, for the purposes of this thesis, are assumed to be a function of body-flexibility.[27]

For example, a child and an adult may each experience a certain discomfort when entering a poorly designed room. But the child is less conscious of himself (relative to his degree of body-flexibility) in relation to the expression. There is less polarization of his body and the expression; a fortiori, less "distantiation"[28] between his body-as-subject and body-as-object. In existential terms, he has less self-awareness of being. The child is more "under the pull" of the expression. He may even act out what it is that he is feeling. It is a common sight to see children "bubble over" or "cower" to certain perceived expressions. In fact the categories of "pleasant" (bubble over) and "unpleasant" (cower) seem to be the extent of the

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[27]The host of cultural and symbolic factors that facilitate the development of body-flexibility are not addressed to in this thesis. That language, broadly defined, plays the role in discovering reality and the individual's relation to reality as described by Church, Vygotsky, Schmidt, Piaget, and others, is implicitly assumed throughout the thesis.

[28]This term is being used as per Schmidt, op. cit.; see note 24.

range of the child's reactions to perceived expressions.[29]

The full range and subtle distinctions that the adult can perceive in various expressions, the exact knowledge, if you like, is late in coming. Further, the different contexts we can experience them in, and perhaps, most importantly, the ability to perceive the meaning of the expression-in-itself, as opposed to its influence on us, are all assumed to be a function of the degree of body-flexibility.

Let us now look at the emergence of the body-schema. On the one hand the body of the infant and the body of the adult are similar. Like all organisms both:

> . . . seek to conserve their integrity, whether biological or psychological; in the face of variable and often adverse, external or internal conditions the organism tends to maintain its existence as an integrated entity. There is, on the other hand, the tendency of organisms to develop towards a relatively mature state: under the widest range of conditions, organisms undergo transformations from the status of relatively little differentiated entities to relatively differentiated adult forms.[30]

Both tend toward the establishment of equilibrium between body and object. Be it the "little differentiated" sensory-motor schema of the infant (e.g., the smile) or the "relatively differentiated" and more-or-less independent

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[29]H. Schlosberg (Brown U.), The description of facial expressions in terms of two dimensions, J. Exp. Psychol., 1952, 44:229-237.

[30]Werner and Kaplan, op. cit., p. 5; cf. note 26.

schema of the adult (e.g., grasping a glass), the essence for bodily functioning is the same. The body adapts to the object (accommodation to Piaget), and reciprocally, the body adapts the object to its existing system of operations (assimilation to Piaget).[31] If the object is not commensurate with the existing schema, then the body mobilizes (i.e., adjusts itself as a unity "to maintain its existence as an integrated entity") and establishes a new equilibrium. On the other hand, the mature adult can readily oscillate between his subjective and objective poles (e.g., the gardener) at the higher levels of consciousness. This is a "differentiated adult form" of experiencing. This mature experiencing is probably seldom engaged in, except in problem solving situations, and only then by an adult who knows his body well—as Socrates might have said had he been using today's insights and vernacular. As far as we can tell, it is not engaged in by an infant before approximately six months.[32] Up to this stage he has yet to polarize body and world as distinct entities. There is "little differentiation" either between the "local organs" or between the body-as-a-

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[31] Cf. note 14 for terminology differences.

[32] The age at which the "so-called" object world emerges is one of the great debates in psychology. To many psychoanalists it emerges around six months. To the Geneva school, it emerges around two years. For the purposes of this thesis, it is sufficient to note that most infants can mobilize to expressions in their behavioural field by six months. Whether or not the infant understands the nature of the independent existence of the expression by this age is a moot point.

whole and "the context, field, or whole of which it is a part." Here I am telescoping the whole process. The child begins to develop schemas about reality. Slowly he comes to perceive the world as constituted. Its permanence no longer depends on personal action but obeys laws that are independent of his body. At the same time his body begins to become differentiated, because schemas reciprocally establish the permanence of the objects in the external world in relation to the system of operations of the body; this is the "two faces of the schema" that Church refers to. With the development of schemas the child begins to perceive his body as the subject and the object of experience. The adult experience of perceiving himself perceiving something, the well differentiated and flexible body-schema, is, as we will see in the experimental section, a longer time in coming than the initial polarization of body and world.

The second question to which this thesis is addressed is:

> What is the nature of the development of body-flexibility?

If a task were designed wherein a person was required to solve a problem in the sense we have been describing, in the sense of being able to experience his body-as-subject and body-as-object, then we might be able to lend empirical support to the above conceptualizations. More specifically,

if we could design a behavioural field that changed in a specific way and measured the amount of time (i.e., trials) required for a person to mobilize his body and make it commensurate with the changed behavioural field, then we could make some statements about his relative degree of body-flexibility. If this ability follows a regular developmental sequence, that is, if it takes longer for children to perform the task than it does for adults, then in addition to lending support to the conceptualizations, we might have a potent way of conceptualizing and measuring cognitive development.

The third question to which this thesis is addressed is:

> What is the relationship of participation to body-flexibility?

The postulate that was examined in this thesis is:

> Participation is a function of body-flexibility.

In sum: (1) it was suggested that there is a developmental continuum in participative perception; (2) it was suggested that there is a similar continuum in body-flexibility; and (3) it was suggested that participation is a function of body-flexibility.

II

> Nothing is inside, nothing outside; whatever is inner is also outer. Go and grasp without delay the holy open secrets.
>
> Goethe, Faust

REVIEW AND ANALYSIS OF THE RELATED LITERATURE

At least since the fifth century B.C., when Leucippus (and Democritus) claimed that "perception and thought arise when images enter from the outside,"[1] the psychology of cognition has been dominated by what Kaplan calls, in his inimitable and in this instance somewhat irreverent fashion, "the dogma of immaculate perception."[2] The essential tenet of this dogma is that the organism is a passive receiver of atoms or images or eidola or ideas or stimuli or sense data or gnostic units or information—the terms varied over the centuries—coming from outside objects which are then re-projected into space—in some cryptic way—to form perceptions which mirror the external world.

Many of the conceptual battles that have been fought by modern psychology have been directed against this dogma.

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[1] Cited in, Philosophical Classics: Thales to St. Thomas, ed., W. Kaufmann, p. 61.

[2] B. Kaplan (Clark U.), The comparative-developmental approach and its approach to symbolization and language in psychopathology, in, S. Arieti, ed., American Handbook of Psychiatry (1966), p. 660.

It would lead us too far afield to consider the specifics of all the attacks on the dogma, but the landmark experiment by Bruner and Goodman[3] is an excellent example of the "new look" revolution. They selected two groups of ten-year-old children, one group from "poor" homes and one group from "rich" homes. The children were given the task of varying a circular patch of light until it matched the size of coins ranging from one to fifty cents. The poor children over-estimated the size of every coin to a greater degree than did the rich children. Control groups randomly selected from the same population estimated size of like graduated cardboard disks. There were no differences in the control groups' estimations. The significance of this experiment for our purposes is not that different socioeconomic classes with different value systems, in the sociological meaning of these terms,[4] see money differently and cardboard similarly, but that "every external perception is immediately synonymous with a certain perception of one's body."

In other words, modern psychology is insisting that the person, in a very real sense, discovers and creates the

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[3]J. Bruner and C. Goodman (Harvard U.), Value and need as organizing factors in perception, J. Ab. Soc. Psychol., 1947, 42:33-44. Cf. P. Saugstad and P. Schioldborg (U. Oslo), Value and size perception, Scand. J. Psychol., 1967, 8:102-114. Cf. notes 46 and 48.

[4]For an original and somewhat frightening look at class values and its impact on the educational transformation, see B. Bernstein (City Day Coll., London, England), Language and social class, Brit. J. Psychol., 1960, 11:271-276.

world around him. Wm. James' "buzzing, blooming, confusion"[5] of sense data is molded, as it were, by the innumerable factors arising in phylogenesis, ethnogenesis, including the structure of language, and in individual experience in ontogenesis. Schmidt, in his development of man as *animal educandum*, the being who must be educated to become fully human, argues that we must see all these factors as part of an integrated whole; and:

> Only then will we be able to see the biologically rooted process of maturation in a light that can reveal the educational dimension which transforms and gives meaning and direction to the child's biological processes, and enables the child itself to give meaning to the world which impinges on him and to transform it, or some of it into *his* world.[6]

Bertalanffy is another leader in the attack on the immaculate perception dogma. In a summary statement of modern psychology's *Zeitgeist*, he notes:

> It will be correct to say that it is the trend in modern psychology and psychiatry, supported by biological insight, to recognize the *active* part involved in the cognitive process. Man is not a passive receiver of stimuli coming from the external world, but in a concrete sense *creates* the world around him. This, again, can be formulated in many ways: in psychoanalytic terms as by Freud; in terms of developmental psychology according to Piaget or Werner or Schachtel; in terms of the 'new look' in perception emphasizing attitudes, affective and motivational factors; by referring to von Uexkülls species specific

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[5] W. James (Harvard U.), *Principles of Psychology*, Vol. 1 (1890), p. 488.

[6] Schmidt, *op. cit.*, p. 16.

> umwelt; to Cassirer's 'symbolic forms'; to von Humboldt's and Whorf's evidence of linguistic (i.e., symbolic and cultural) factors in the formation of the experienced world. The world as we experience it is the product of perception, not the cause of it.[7]

What we have then is a continuum extending deep into history. At the historical end, perception is seen as something one passively receives from the external world; space, objects, and events have their own material organization and perception is a function of these organizations; there is a simple one-to-one correspondence between these organizations and their resulting percept, that is, the organism mirrors the external world. At the contemporary end perception is seen as something one actively engages in in a dialectical exchange with the external world; the importance of the material organization of the external world is not denied, but it is seen as a function of the "educationally transformed" body-schema; literally, as the person discovers and creates himself he discovers and creates his world. The reader is requested to keep this continuum in mind as we turn to the literature on the participation phenomenon as the various interpretations can be seen as points along the continuum and each interpretation should be seen in light of its historical epoch.

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[7]L. von Bertalanffy (U. Alberta), Organismic Psychology and Systems Theory: Heinz Werner Lectures (1966), p. 10.

LIMITATIONS

A review of all the literature which is one way or another related to this problem area would extend to many volumes and would also become unwieldy. Moreover, instead of trying to duplicate the works of others in closely related areas, here is a brief list of recent works that contain analyses or reviews or bibliographies of the same.

1. In the clinical/counselling area: T. Lesh (Lethbridge Jr. Coll.), Zen meditation and the development of empathy in counselors, J. Humanistic Psychol., 1970, 10:39-83; C. Rogers (U. Wisconsin), The therapeutic relationship: recent theory and research, Australian J. Psychol., 1965, 17:95-108.

2. In the person perception area: M. Gon, A Study of Person Perception (Unpub. Ph. D. thesis, U. Alberta, 1970); G. Miliaret (U. Paris), Psychology of the use of Audio-Visual Aids in Primary Education (1969).

3. In the area of logic: G. Ryle (Magdalen Coll., U. Oxford), The Concept of Mind (1949); A. Michotte (U. Louvain), Causalité, Permanence, et Réalité Phenomenale (1962).

4. In the area of aesthetics: Earl of Listowel (U. London, England), A Critical History of Modern Aesthetics (1966); J.P. Weber (U. Paris), La Psychologie de 1' Art (1966).

The limited area that does concern us here has in recent years received a good deal of attention under the heading of physiognomic perception. The term "physiognomic" designates a general mode of cognition in which we perceive objects as directly expressing an inner form of life, that is, in the same manner in which we perceive a physiognomy, or the

facial expressions, or the acts of living organisms. This dynamic mode of cognition is usually contrasted to the "geometrical-technical" or contemplative mode of cognition in which we perceive objects in terms of our "cultural categories of thought."

To say that we mobilize to the physiognomic meaning-qualities (i.e., to the expressions) of gestures, gaits, and facial dynamics is to say the obvious. Likewise, that we are not always sensitive to the expressions of other cultures. What is not so obvious is that expressions, which Sapir refers to as events that are "known by none and understood by all,"[8] are of a much wider occurrence than the term physiognomic might suggest. Uexküll,[9] for instance, in his analysis of the world of animals and humans speaks of the functional signs of objects (e.g., the sitting tone of a chair); similarly, Lewin[10] refers to the so-called demand character of things (e.g., a pencil is something to write with; an adjective signals the approach of a noun); and Werner[11] stresses the importance of expressions by

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[8] E. Sapir (Centre des Étude Sociales, U. Paris), The unconscious patterning of behaviour in society, in, D. Mandlebaum, ed., The Selected Writings of Edward Sapir (1949), p. 556.

[9] J. von Uexküll, A stroll through the worlds of animal and man, in, C. Schiller, ed. (Ludwig-Maximilians-U., Munchen), Instinctive Behaviour (1934).

[10] K. Lewin (U. Berlin), Dynamic Theory of Personality (1935).

[11] H. Werner (U. Hamburg), Comparative Psychology of Mental Development (1926).

systematically pointing to their importance for ontogenesis, language behaviour, and psychopathology. Allport notes its importance for our understanding of consciousness as intentional when he states that "the key to person perception lies in our attention to what the other is intending or trying to do."[12] In other words, what we perceive in attending to other people is not so much particular stimuli but an intention or a mood. When a person is friendly or hostile, when he is playing a game or trying to sell us some commodity or intends to make love, we recognize no specific stimulus or cues in the sense of single events, but merely a pattern of a certain kind—an expression that has meaning for us, and that meaning is perceived directly and immediately. We can also contemplate it, but our concern here is with participative or physiognomic perception and not with contemplative perception. We are arguing that the understanding of the expression is not by contemplatively mobilizing toward the expression, that is, not by analyzing or judging the expression intellectually, rather that the expression is understood by a more-or-less blind judgement of the expression. The expression reveals its meaning immediately, we perceive it directly, and not as a contemplated meaning behind the expression. When we see a happy expression we do not "think" of happiness we just see it. Merleau-Ponty

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[12]G. Allport (Harvard U.), Pattern and Growth in Personality (1961), p. 520.

states it thus:

> The whole difficulty consists in rightly conceiving such an act without confusing it with an operation of knowledge. The communication or comprehension of gesture is obtained by the reciprocity of my intentions and the gestures of others, or of my gestures and the readable intention in the conduct of others. Everything happens as if the intention of others resides within my own body and mine in theirs.[13]

It seems likely that the contagion of affect among infants in a nursery and among adults in a crowd belong to a similar class of events. There is also substantial evidence that this communication of significant meaning exists in some measure in our mutual relations to and also between the higher animals. Köhler,[14] for instance, reports that the chimpanzee immediately and correctly interprets the slightest change of human expression whether menacing or friendly; Miller et al,[15] experimentally demonstrate that the effect of fear and/or anxiety can be discriminated by rhesus monkeys in the facial and postural expressions of other monkeys; and Kortlandt[16] notes the reverse relation to that reported by Köhler, that is, humans can spontaneously and correctly interpret the facial and postural expressions of

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[13] Merleau-Ponty, The Phenomenology of Perception, p. 215.

[14] W. Köhler (U. Berlin), The Mentality of Apes (1927), p. 307.

[15] R. Miller, J. Murphy, and A. Munsky (U. Pittsburg), Non-verbal communication of affect, J. Clin. Psychol., 1959, 15:155-158.

[16] A. Kortlandt (U. Amsterdam), Chimpanzees in the wild, Scientific Amer., 1962, 5:206-250.

apes in the wild. Tinbergen's[17] descriptions of the "infective" character of certain types of movement among fish and birds, Lorenz's[18] conception of the "innate releasing mechanism as a perceptual function," Haldane's[19] analysis of the swarming of bees, and numerous other ethological observations[20] are all instances of a similar class of events.

Throughout all these instances runs the basic assumption of this thesis: namely, that the organism mobilizes to the expressions that signal significance for it, which in turn reflects the expressions to which it is sensitive. The mobilization may be within the limited umwelt of the bee, where the expressions to which it is sensitive are given to it in terms of the genetically defined receptor and effector system, or it may be within the potentially unlimited world of the human adult, where the expressions to which he is sensitive are given to him in

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[17] N. Tinberger (U. Oxford), The Study of Instinct (1951).

[18] K. Lorenz (Ludwig-Maximilians-U., Munchen), The role of Gestalt perception in animal and human behaviour, in, L. Whyte, Ed., Aspects of Form (1951).

[19] J. Haldane (U. Coll., London, England), Animal ritual and human language, Diogenes, 1953, 4:61-73.

[20] See R. Chase (Johns Hopkins U. Sch. Med.), Evoluntionary aspects of language development and function, in F. Smith and G. Miller, eds., The Genesis of Language (John Hopkins, 1966), for an analysis of ethological studies.

terms of his "educationally transformed" body-schema, but the basic assumption of a mutually schematized body:world remains the same in all instances.

Because of the methodological requirement of operationally defining the materials that carry expression, the materials used in the experimental section of this thesis are necessarily narrow in range. Therefore, it behooves us to indicate some of the extent of the phenomenon.

Most writers in this area suggest that all objects can express physiognomic properties. This includes words that symbolize objects. There are a number of experiments that addressed themselves to this very question; namely: is there a dynamically lawful relationship between the meaning of a word and the response to it in a nonrepresentational line drawing. For example, Uznadze,[21] using Georgian Ss, and Köhler,[22] using German Ss, found better than chance agreement in the matching of nonsense words (MALUMA, TAKETE) to meaningless line designs. Kraus,[23] using German Ss, found 85 percent agreement in the matching of familiar words

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[21] D. Uznadze (Georgian Inst. of Psychology, Acad. Sc. Georgian S.S.R.), Ein experimenteller Beitrag zum Problem der Namengebung, Psychol. Forsch. 1924, 5:24-43; see note 24.

[22] Cited by, G. Allport and P. Vernon (Harvard U.), Studies in Expressive Movement (1933), p. 181; see note 24.

[23] R. Kraus (U. Hamburg), Ueber graphischen Ausdruck, Zsch. f. Angew. Psychol., 1930, 48:1-141; see note 24.

(GOLD, IRON, SILVER) to a different type meaningless line designs. Scheerer and Lyons[24] report 75 percent agreement in a combined replication of the previous experiments. The materials are reproduced in Figure 1. The reader can try the experiment himself.

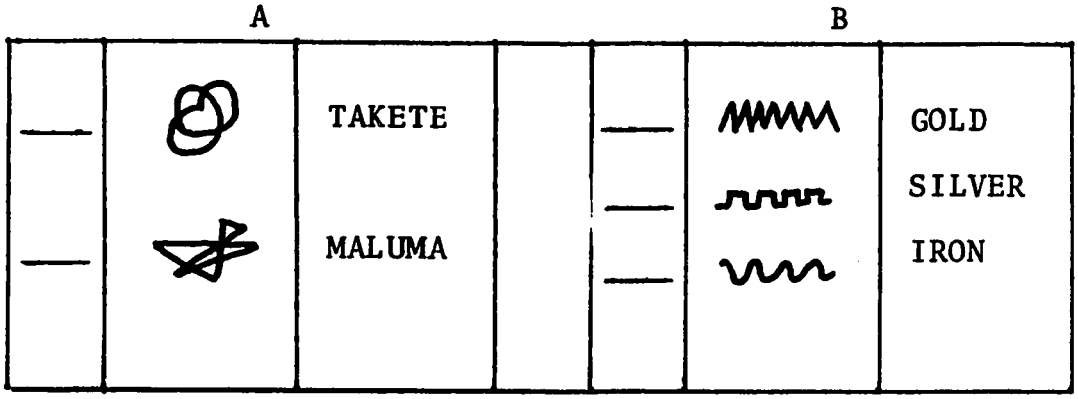

Figure 1. Match Line Designs to Words (after Scheerer and Lyons)

Since Scheerer's and Lyons' Ss were American, they hypothesized that the physiognomic meaning-qualities of these designs and words may be universal. However, a cross cultural study remains to be done using these materials or the materials used in this thesis to validate that hypothesis.

Returning to Figure 1 for a moment, I won't tell you the correct answers to the matchings of column B, but one solution to the problem is don't try to figure out (using

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[24]M. Scheerer and Joseph Lyons (U. Kansas, Lawrence), Line drawings and matching responses to words, J. Pers., 1957, 25:251-273; the Uznadze, Köhler, and Kraus experiments are also cited in Scheerer and Lyons.

contemplative perception) which line goes with which word, though it can also be solved that way, rather just briefly glance at the design and let the meaning come to you physiognomically. With column A, the jagged design is obviously TAKETE and the rounded design MALUMA, but not, as Brown[25] convincingly demonstrates, because of what Sapir calls "phonetic symbolism". Rather, whatever else words and objects may have they also have physiognomic properties, and we can perceive their physiognomic differences and similarities just as we can perceive differences in size and shape.

The objects we come in contact with in our daily affairs can all be seen as carriers of expressions. For example, our here and now impressions of people are influenced by their expressive features. A girl of ordinary or even unfortunate configuration can appear stunning to us by skillfully using personal adornment. Our appreciation of art partially relies on its expressive features. A painting whose subject matter is reproduced with geometric and chromatic fidelity is likely to seem still and lifeless. It is not surprising that the explicit evoking of our tendency to perceive the meanings of expressions, or in Aristotle's terms, our tendency to "animate the inanimate,"[26] should have

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[25] R. Brown (Harvard U.), Words and Things (1957), pp. 110-139; also p. 115 for a view of Uznadze's impact on the study of physiognomic perception.

[26] Cited in Kaufman, op. cit.

become one of the main tools of artistic expression. The poet or painter must conjure up the character of our physiognomies in an especially vivid manner so that the expression of the mundane comes striking home to us. The painter must construct his subject matter so that its "expressive lines are felt immediately and from within"[27] if his painting is to communicate life-like experience. Expressions such as the aggressive stroke of the lightning, or the soothing rhythmic tattoo of the rain, or the wild landscape, or the thundercloud hanging threateningly over us, are more than merely metaphors. They describe real attributes of our perceptions in the terms in which they occur. This does not mean that these attributes belong to the object in the sense of what we know about them contemplatively; e.g., a thundercloud is a cloud charged with electricity, etc.; but they are attributes given to us physiognomically, and they are part of the world as we know it and as it influences our behaviour.

Examples of the type we have been citing lead Church to conclude that physiognomic perception is our dominant mode of cognition. In other words, what we are calling participation: the mobilization of the body to the physiognomic meaning-qualities of its behavioural field, is the prime mode of bodily functioning even in adults.

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[27]This aphorism is part of Cézanne's philosophy of art. Cited in, Weber, op. cit., p. 64.

This conclusion is more overtly evident in the vast range of contexts wherein the perceiver can be observed posturally participating in the expressions of his behavioural field. For example, we can observe the spectator at a football game helping to block the kick, the opera buff whose larynx quivers and heels raise as the soprano strains upward, the driver straining forward as his car labours up a steep incline, the cinema audience that sways in the opposite direction to prevent the heroine from falling over the precipice, the viewer being pulled awry or feeling uncomfortable by a Picasso painting of a house tilted upon its foundation and so on. In all these examples the perceiver and the expressions of his behavioural field interpenetrate each other and act on each other not just from without but from within. He understands the meaning of the expression as if he were one with it, not just detachedly or over against it, but devoid of objectivity and co-existent with it.

Different writers refer to this kind of perception by different terms. For example: (1) Werner[28] calls it "vital sensation"; (2) Lipps[29] calls it "Einfühlung"; (3) Darwin[30] calls it "the recognition of emotional

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[28]Werner, Comparative Psychology of Mental Development.

[29]T. Lipps (U. Leipzig), Empathy, Inner Imitation, and Sense Feeling (1893).

[30]C. Darwin (U. Oxford), The Expression of the Emotions in Man and Animals (1872).

expression"; (4) Wundt[31] calls it "umdenken"; (5) Mead[32] calls it "rôle taking"; (6) Sullivan[33] calls it "emotional contagation or communion"; (7) Arnheim[34] calls it "the direct perception of expression"; (8) Schachtel[35] calls it "kinesthetic empathy"; (9) Straus[36] calls it "aesthesiology"; (10) Lévy-Bruhl[37], Piaget[38], Church[39] and this writer call it (by Lévy-Bruhl's term) "participation". This profusion of terms (and the list could go on much longer) is an indicator of one problem in this research area. Each term has something in common with the others, yet is used slightly differently within each theoretical framework. Some theorists use two terms for a similar yet conceptually distinct phenomenon. For example, Freud[40] suggests that

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[31]W. Wundt (U. Leipzig), Logic (1895).

[32]G. Mead (U. Chicago), Mind, Self and Society (1934).

[33]H. Sullivan (William Alanson White Inst.), The Interpersonal Theory of Psychiatry (1954).

[34]R. Arnheim (Sarah Lawrence Coll.), The Gestalt theory of expression, Psychol. Rev., 1949, 56:156-171.

[35]E. Schachtel (William Alanson White Inst.), Experimental Foundations of Rorschach's Test (1957).

[36]E. Straus (V.A.Hosp. Lexington, Ky.), Aesthesiology and hallucinations, in, R. May, et al., eds., Existence (1958).

[37]L. Lévy-Bruhl (U. Paris), Les Fonctions Mentales dans les Sociétés Inférieures (1910).

[38]Piaget, Play, Dreams, and Imitation.

[39]Church, op. cit.

[40]S. Freud (U. Vienna), Group Psychology and the Analysis of the Ego (1921).

expressions that have no particular emotional significance for us are understood through "empathy" and those that have emotional significance for us are understood through "identification". Other psychoanalysts use the terms empathy and identification synonymously. This situation led Cooper to recently exclaim: "When one surveys the literature in this area [of participation] one is impressed with the confusion and lack of clarity contributed both by the proliferating measures and unclear conceptualizations."[41] To avoid a further profusion of terms, "participation" was selected as the referent term for this thesis because: (1) it is the term used by many of the cognitive theorists, and this thesis is of that tradition; (2) it seems to capture the metaphor of "immediately knowing the meaning of the expression from within" better than many of the other terms, and (3) the other terms have specific denotations within their respective theories. With body-flexibility as the conceptualized explanation of the participation phenomenon, it is hoped that a diminution of the confusion and some clarity will accrue to at least part of this problem area.

What has been said so far provides the context that will enable us to review in more detail some of the theoretical approaches to this problem area.

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[41] L. Cooper, The Relationship of Empathy to Aspects of Cognitive Control (Unpub. Ph. D. thesis, Yale, 1967), p. 1.

OUTLINE

The remainder of this chapter is divided into two parts. Part I consists of a critique of the assumptions inherent in many contemporary theories of this kind of perception which we are calling participation. Part II consists of a review of the research literature centered on the materials used in the experimental section of the thesis to measure the phenomenon of participation.

PART I

A survey of definitions of participation (under its various and kindred names) used in contemporary theory reveals that many of them revolve around the idea that the perceiver somehow identifies with, or transposes into, or puts himself in the place of, or assumes the rôle of the object of participation.[42] This rôle taking assumption (rôle taking is here used as the referent term for the contemporary theories that adhere to this idea that the perceiver identifies with, etc.) has been criticized on

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[42] R. Dymond (U. Chicago), A scale for the measurement of empathic ability, J. Consult. Psychol., 1949, 13:127-233; W. Kerr and B. Speroff (U. Illinois), The Measurement of Empathy (1951); C. Truax, et al. (U. Wisconsin), The therapist's contribution to accurate empathy, non-possessive warmth, and genuineness in psychotherapy, J. Clin. Psychol., 1966, 22:331-334; T. Sarbin and C. Hardyck (U. California), Conformance in role perception as a personality variable, J. Consult. Psychol., 1955, 2:109-111; H. English and A. English (Ohio State U., Columbus), A Dictionary of Psychological Terms (1958).

various grounds.[43]

Firstly, it is possible to perceive the meanings of the other's expressions when one's own feelings are not at all identical with them, and perhaps are even in sharp contrast to them. You may perceive the person before you as sad, although you yourself may not be sad. You may be conscious of the gaiety of others yet you yourself may be immersed in sadness. You may perceive expressions of others which you yourself have never experienced. If we take this rôle taking assumption in its broadest possible meaning, namely, that we do in fact perceive expressions, then the assumption becomes too general, telling us little more than that the fact occurs without accounting for how it occurs. In other words, the assumption states the fact, it doesn't explain it. If we take the assumption in its narrowest possible meaning, namely, that we mirror the external reality, then the assumption becomes simply questionable. How does it account for the instances just cited? Do we take the rôle of the expression only with our surface analyzers? This would suggest a part of the body that functions independently of the whole, a suggestion that we

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[43] G. Allport (Harvard U.), Personality (1937), pp. 526-530; K. Koffka (Smith Coll.), Principles of Gestalt Psychology (1935), pp. 655-656; L. von Bertalanffy (U. Alberta), The mind-body problem: a new view, Psychosomatic Med., 1964, 26:29-45; W. Ittleson and H. Cantril (Brooklyn Coll.), Perception: A Transactional Approach (1954), p. 31.

reject in our construct of body-flexibility, and a suggestion that phenonemonological and experimental evidence refutes. Memory could rescue the assumption. But how does memory account for the understanding of expressions not previously experienced? This is not to imply that if there is nothing in our educationally transformed body-schema to make us capable of understanding certain expressions that we would automatically give them meaning. For instance, the educational experience of the cave man was probably different in many respects from our own and as such we would probably have difficulty understanding his expressions, at least via that mode of cognition we are calling participation. From our own theoretical position, the expression is not understood in itself, it is understood in relation to the degree of body-flexibility. It is this type of theoretical position that is behind Merleau-Ponty's statement that "the 'understanding' of an expression is <u>obtained by the reciprocity</u> (emphasis added) of one's intentions and the expressions of the other." But there is an important conceptual difference between our position and what is usually meant by the associationist construct of memory. Even without our construct of body-flexibility as the offered explanation of participation it is evident that the perception of expression is much too immediate and direct to be explained by memory.

The assumption of rôle taking seems to be particularly

untenable when the object of participation is a social situation. When we perceive the fury of the lynch mob whose rôle are we taking? Do we take the rôle of the intended victim, of the leader, or of the mob's fury? Do we take the rôle of the average member of the mob? If so, on what basis do we determine this average member? This assumption is contrary to our own perceptual experience. We perceive the meaning of that mob's expression before we perceive individual members of that mob. A similar example is we often perceive an expression as soon as we enter a room. Before we are conscious of the individuals in that room, we may be conscious of the group's tenseness, etc. In many instances we perceive something well enough to understand that it is happy or sad but not well enough to know what it is. And as Maslow and Mintz[44] experimentally demonstrate, our thresholds for recognition of feeling tones and moods are considerably lower than our recognition of the specific stimuli which give rise to the tones and moods. How is it possible to take the rôle of specific stimuli that we cannot specifically specify? Freud for example claims that we understand specific stimuli via a process of empathy if it is of no emotional significance to us and via identification if it is of emotional significance

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[44] A. Maslow and N. Mintz (Brandeis U.), Effects of esthetic surroundings, J. Psychol., 1956, 41:247-254.

to us. This means that we must first discriminate the degree of emotional significance that the specific stimuli has for us, then bring either one or the other process into play. But if on occasion we cannot specify the stimuli how is it possible to bring one or the other into play? Besides, this type of construct necessitates our making a contemplative judgement prior to a participative judgement of the same; like the construct of memory it makes participation a second order or mediated response rather than a more-or-less unmediated response; and like memory, by the time all these factors have been brought into play the expression has already been perceived and passed into experience.

The assumption of rôle taking also seems inadequate when the object of perception is inanimate. It cannot readily account for our perception of the threatening thundercloud or the dancing daffodil or the sadness of the weeping willow. Do we take the rôle of the landscape or the thundercloud or the daffodil or the willow? Moreover, despite the vehement criticism of Klages' non academic academic activities, we have yet to improve on his concept of graphology as a "crystalized form of expressive gesture."[45]

Related to the assumption of rôle taking is the other leg of the immaculate perception dogma, namely, the assumption of projection; and with this latter assumption

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[45] L. Klages (Ludwig-Maximilians-U., Munchen), The Science of Character (1929).

we run into a conceptual and terminological problem. Because, on the one hand many contemporary theories define participation as the ability to feel into or to project into objects, and on the other hand, our own view of an exchange of significant meaning based on a holistic body: world dialectic is also a projection type of assumption. The major distinctions between the respective views can be put this way.

In our view the body is not only centered in itself, but is also projected outward from itself, and the complement, the perceived world is simultaneously what it is in itself and what it is for the one who perceives it. In every perception, be it of the body itself as the subject and object of perception or of the external world, the relational dialectic of body:world is always operative. This holistic view necessarily implies that any perception is essentially projective. It implies that what we traditionally call the cognitive, conative, and affective organismic states (i.e., attitudes, desires, emotions, frustrations, intentions, motivations, needs, thoughts, values, etc.) are mutually interwoven in the "integrated system of functionally equivalent sensory modalities" and are part and parcel of any perception. An example of this view is given by Postman and Bruner.[46] They gave six-year-

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[46] L. Postman and J. Bruner (Harvard U.), Satisfaction and deprivation as determinants of perceptual organization. Paper read at East. Psychol. Assoc., 1949; cf. notes 3 and 48.

old children the task of judging the height of three-inch toy figures. The toys intrinsically desirable (by the value standards of this cultural group) were overestimated in height as compared with control blocks which were not as intrinsically desirable. During the first part of the experiment the children were promised that they would continue to receive the toys. When the experimenter broke his promise, when the toys became unavailable their apparent size underwent a further increase. A control group who were not given the experimental treatment of broken promise, frustration, etc., showed no comparable increase. There are many implications which could be drawn from this experiment, in fact from most of those cited in support of our views, with reference to the emergence of percepts, but the important point here for our purposes is that the so-called organismic states function as an integrated whole, and they are not just centered in the body, they are also projected outwards in a definite relation to the perceived world. That world-as-perceived is also constituted in itself (the physical dimensions of the toy figure did not change), and in a sense, it also projects its expressions. For instance, certain expressions stand out from the world for the perceiver; the meaning of the expressions can change when the background changes; and the meaning of an expression is not exhausted by merely looking at it. These mutual projects, from the body to the world, and from the world to

the body, though theoretically distinct (and in actual experimentation we have attempted to design for optimal operation of both) are reciprocally interdependent, and are, in this thesis regarded as being mediated by the degree of body-flexibility of the perceiver.

Projection is not conceived in this manner in many contemporary theories (see notes 42 and 43). What is being termed projection in these theories seems more appropriately termed "re"-projection, because the underlying assumption is that what is being projected (i.e., emotion, etc.) had been previously associated with the present stimulus or cue. But conceived in this manner, re-projection cannot parsimoniously account for the perception of the expression of inanimate objects or social situations. Why is sadness re-projected onto the weeping willow and happiness onto the daffodil and not vice versa? Because children will bubble over with glee to a field of daffodils without having learnt Wordsworth's immortalization of the same. How can a perceiver re-project group structures when he himself may never have experienced them? Even in the area of person perception the re-projection hypothesis is suspect. Suppose that Sam reports that he sees before him, seated on a chair, a sad man on the verge of tears, and the man does cry, and admits that he feels sad. The theorists who assume the re-projection hypothesis would say that while Sam perceived the man and the chair, he did not really perceive the sadness. Rather

Sam re-projected the emotion of sadness onto the man. The question to be asked of projection conceived in this way is: Why did Sam project sadness and predict tears rather than project happiness and predict laughter? The answer given by these theorists is that in the past Sam learnt to associate certain facial and postural expressions with his own feeling of sadness. The well known criticism leveled against this view is that it presupposes our going around with mirrors and studying our expressions whenever we experience emotions, something we obviously do not do. Moreover that a neonate could make such a detailed examination of his own and other's expressions is also obviously not likely. "This notion" (i.e., the perception of expression based on the re-projection of learnt associations), as Goldstein puts it, "must be rejected out of hand; it cannot be based on any of the varieties of association theory for the very simple reason that the neonate is not capable of mirroring anything."[47]

It seems more likely that developmentally and microgenetically meanings precede objects in perception. In the developmental instance, the neonate mobilizes to the meaning of the mother's intended projects, in the symbiotic world of

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[47] K. Goldstein (1148, 5th Ave., NYC), The smiling of the infant and the problem of understanding the other, J. Psychol., 1957, 44:175-191; cf. Merleau-Ponty, The Primacy of Perception, pp. 69-155.

mother and neonate in which the neonate is embedded, long before he has learnt what she looks like, in fact before he knows her as mother qua mother. In the microgenetic instance, there are many experiments which could be cited in support of the construct that the first openings onto the world are of the nature of mobilization toward the meaning of the object, as opposed to the mobilization toward the object qua object, but few seem to be as well controlled as the one by Atkinson and Walker.[48] They selected college students on the basis of the amount of motivation toward affiliation as measured by the Thematic Apperception Test. The students were subsequently asked to select the clearest and most apparent picture of a group of four presented to them at their individualized threshold levels in a tachistoscope. In every group of pictures one exhibited people and three exhibited inanimate objects. Students high in the motivation toward affiliation chose the people pictures most often. Students low in the motivation chose the inanimate pictures most often. The important points here for our purposes are: (1) motive relevant stimuli are not chosen randomly but are chosen in accordance with the intentional projects of the body; (2) the stimuli that the body chooses to mobilize toward, and not to mobilize toward,

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[48] J. Atkinson and E. Walker (U. Michigan), The affiliation motive and perceptual sensitivity to faces, J. Ab. Soc. Psychol., 1956, 53:38-41; cf. notes 3 and 46.

even at the lower levels of bodily activity is not arbitrary, in other words, the relational dialectic of body:world is organized and integrated at all levels of activity; and (3) empirical support for our postulate that meaning-qualities of the perceived world are a function of body-flexibility. This brings us to the cryptic part of the immaculate perception dogma.

The assumption that underpins the rôle taking and re-projection assumptions is that the emotions or any of the traditional organismic states are purely subjective, that is, they are centered solely in the body. Thus the sadness which Sam reports is not considered to be given in the same sense that the stimulus configuration of chair and man are given. The theorists who emphasize rôle taking would say that the stimulus complex evoked or elicited, depending on the individual theorist's preference for Pavlovian or Skinnerian views of conditioning, the emotion of sadness from within the body's store of stimulus-sadness links, and the rôle taker then mirrors the configuration with his own sadness. The theorists who emphasize feeling into or re-projecting would say that the process does not end with mirroring, rather the perceiver re-projects the link outward onto the configuration. This latter phase of the process is necessary because, as Lipps[49] correctly notes,

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[49]Lipps, op. cit., pp. 111-120, et passim.

an object demands that it be perceived as a unity, a unity that includes the demand characteristics of the object and the feelings of the perceiver. That an object must be perceived as part of a whole process of body:world transactions is not being denied, in fact it is being insisted on. The question is do the transactions transpire in the linear fashion suggested by these theorists or do they transpire in terms of the relational dialectic that we have been suggesting? Moreover in our own view the emotions are not pure states of the body, like perhaps the well-being in a hot bath, but are part of a definite reciprocity between the body and the object.

Arnheim[50] sees the re-projection assumption as holding an intermediary position between the rôle taking assumption and his own Gestalt position, and there is little doubt that re-projection is a conceptual improvement over rôle taking. But the improvement is not of the order of a fundamental change, because both assumptions are underpinned by (naming it specifically) the James-Lange theory that one's own body is the proximate cause of the emotions. The gist of this theory is that the feeling of the

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[50]Arnheim, op. cit.

disturbance is the emotion.[51] For example, a person does not run from an angry bear because he is afraid, but he is afraid because he runs (or flexes to run—incipient running). Sam did not perceive the emotion which gave rise to the bodily state, but he perceived the bodily state which gave rise to the emotion. James-Lange sees the felt emotion as a secondary or mediated response based on the perception of our own bodily state. In our own view, the mobilization of the body to the expression (i.e., angry bear, sad man) and the consciousness of the mobilization are both part of the same global response to "the readable intention in the conduct of others." In other words, when we see the expression "angry bear" we do not think of anger, fright, etc., we see it. Sam saw the meaning of the expression "a-sad-man-on-the-verge-of-tears," he did not have to contemplate his own bodily state.

One group of researchers claim that the reason for the immediateness of this response is that the expression, as a stimulus object, acts directly on our efferent systems

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[51] James, op. cit. James regarded the body in an atomized way. Had he admitted that the body is felt together with the environing world, not alone, then there would have been agreement between our positions. But, he did not remain true to his own insight. He maintained that an emotion is only the feeling of a localized part of the body—like the stomach: "We have, as Prof. Lange says, no immediate criterion by which to distinguish between spiritual and corporeal feelings; and I may add, the more we sharpen our introspection the more localized all our qualities of feeling become," p. 455.

without benefit of higher level representation or other mediation.[52] This is not to say that we do not perceive the stimulus object; but our realization of what it is in the contemplative sense is again contemporaneous with our body mobilization. That is, contemplative mobilization is sluggish by comparison with participative mobilization. It is only when we have already begun to orient ourselves bodily to the stimulus object that the stimulus object is explicitly perceived.[53] Here we must mention again the principle of microgenesis. As we become explicitly conscious of the angry bear or the sad man we may modify our initial understanding of the event. We may figure out different ways to solve the respective problems. But this kind of problem solving is not what is implied by the assumptions of rôle taking and/or re-projection inherent in many contemporary theories of that kind of perception we are calling participation.

In other problem areas these assumptions are more viable. The importance of rôle taking, in the more loose

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[52] See P. Anokhin (First Medical Inst., Moscow), The role of the orienting-exploratory reaction in the formation of the conditioned reflex, in, L. Voronin, et al., eds., Orienting Reflex and Exploratory Behaviour (1958); F. Hayek (London Sch. Econ., England), The Sensory Order (1952); and E. Strauss (U. Berlin), The Primary World of the Senses (1932), for differing but complementary views of the contemporaneousness of sensory and bodily activity.

[53] Cf. Church, op. cit., p. 29, and Anokhin, op. cit., p. 5.

meaning of this term,[54] has been a major and beneficial construct for an appreciation of the socialization process.[55] Moreno[56] in the area of therapy, and Pilkey[57] in the area of retardation, have both used variants of this theme to good advantage. Cézanne's[58] attempts to construct his subject matter so that the viewer would immediately feel the way the lines felt, and Stanislavsky's[59] method acting both owe to the idea of re-projection or Einfühlung. Some writers[60] suggest that the importance of Einfühlung for aesthetics as a whole is paramount. What many of the contemporary theorists in our own problem area seem to have done however, is to have taken over these terms from areas in which their use was entirely justified and ascribed them carte blanche without looking too carefully at their underlying assumptions.

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[54]See W. Coutu (Pennsylvania State Coll.), Rôle-playing vs. rôle-taking: an appeal for clarification, Amer. Sociol. Rev., 1951, 16:180-190, for the conceptual distinctions between these terms.

[55]Mead, op. cit.

[56]J. Moreno (Moreno Inst., Beacon, N.Y.), Psychodrama (1964).

[57]L. Pilkey (U. Kansas City), Psychodrama and empathic ability in the mentally retarded, Amer. J. Ment. Retard., 1961, 65:595-605.

[58]Weber, op. cit., p. 100.

[59]C. Stanislavsky (Actors Inst., Moscow), An Actor Prepares (1936); cf. R. Natadze (Acad. Sc., Georgian S.S.R.), On the psychological nature of stage impersonation, Brit. J. Psychol., 1962, 53:421-429.

[60]Listowel, op. cit., p. 78.

The consequence of this has just been described.

However, not all contemporary theories adhere to these assumptions. In fact it was in rebellion against these assumptions, or more generally against the linear equations of the associationists, that the Gestalt theory of perception was born.[61] There is little doubt that the Gestaltists, in their special application of the holistic principle to perception as well as in their apprehension of the behavioural (or phenomenal) field were the agents of a constructive advance over the earlier associationists. Our constructs, that the organismic states are functionally integrated and are not just centered in the body but are part of a reciprocal dialectic between body:world, that there are two kinds of functionally integrated perception, that the perception of expression is immediate, that all objects, those animate and inanimate as well as group structures,[62] are carriers of expression, that expressions can be on the objective side of and stand out from the behavioural field are all indebted to Gestalt theory. In the Gestaltist language, the sadness of the man is considered to be as much a part of Sam's perceptual Gestalt as is the chair and the man. The facial and postural

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[61] Koffka, op. cit., pp. 26-29.

[62] S. Asch (Swarthmore Coll.), Social Psychology (1952).

expressions of the perceived man are thought to correspond, to some extent, to his concomitant psychial events; and some characteristics of the overt expressions are thought to be mapped in by the corresponding psychophysical organization which is set up in the perceiver (i.e., Sam). In short, isomorphic relationships between all parts of the behavioural field account for the accuracy and immediacy of the perception of expression. The only criticism of Gestalt theory that concerns us here is their construct of isomorphism. Therefore what beckons at this point is to describe and analyse their construct.

The impact of the forces of expression transmitted by any visual pattern are considered to be an intrinsic part of any percept according to the Gestaltists. In fact they see the forces of expression as being a primary content of perception. This fact tends to be lost sight of, according to Köhler, because we are trained in a scientifically oriented society to ignore the expressive attributes of perception; nevertheless it can be readily observed in children, primitives, and certain cases of pathology.[63] The priority of expression came about according to Köhler, because the organism developed its senses to aid in its survival, and in this context the intentional meaning of the

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[63] W. Köhler (Swarthmore Coll.), Psychological remarks on some questions of anthropology, Amer. J. Psychol., 1937, 50:271-288; cf. Werner, Comparative Psychology of Mental Development, pp. 25-100.

environment is the most important thing to be perceived. Are the forces (of the visual pattern) which face one friendly or hostile? The immediate answer to this question is required by all organisms according to Köhler. That expressive forces are primary is also evident from the fact that:

> . . . the face of person is much more easily remembered as being alert, clever, energetic, than being triangularly shaped, having slanted eyebrows, straight lips, etc.[64]

The Gestalt studies on illusions, figure-ground reversal, part-whole relation, autochthonous laws of organization, etc., are pertinent here since all these attributes of perception contribute to the expressiveness of any object. These attributes do not appear to the perceiver because he takes the rôle of or re-projects them according to the Gestaltists, but because these attributes:

> . . . are the psychical counterpart of the physiological processes which organize the percept in the neural field of the optical sector, that is, the cerebral cortex, the optic nerve, the retinae of the eyes.[65]

Analogous processes occur in all sense modalities in that:

> . . . expression is conveyed not so much by the geometrical-technical properties of the percept as such, but by the forces they can be assumed to arouse in the nervous system of the perceiver. Regardless of whether the object moves (dancer) or is immovable (painting), it

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[64]Arnheim, op. cit., p. 156.

[65]Arnheim, op. cit., p. 157.

> is the kind of directed tension (force) transmitted by the perceptual pattern that is perceived as expression.[66]

The forces which are organized in the nervous system are thought to be isomorphic to the perceiver's parallel psychical system. This means that if the forces which determine the structure of the physiological system are paralleled by the psychical structure, then there is correspondence between all parts of the behavioural field, and it becomes understandable why apparent psychical meanings can be read off directly from a person's appearance or conduct.[67] For instance, a person's mood may be structurally similar to the bodily behaviour which accompanies that mood. The gesture of an actor, the motions of a towel on a clothesline, the shape of a cloud, all contain structural features whose kinship with similarly structured mental events are immediately felt because of this isomorphism. We noted in Figure 1, that, although the drawings and the words are essentially meaningless they leave us with a distinct <u>feel</u>; we know how they feel not just by being over against them, but how they feel from <u>within</u>. We know which design should be called TAKETE

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[66]Arnheim, <u>op. cit.</u>, p. 158.

[67]Arnheim, <u>op. cit.</u>, p. 160. Arnheim is being quoted in this regard, because unlike some of his fellow Gestaltists he sees expression as the apparent meaning of the psychical state as revealed by the configuration of the perceptual pattern and not as the understanding of the mind of the other. The latter being a more profound question requiring a number of philosophical, physiological, and psychological techniques to evaluate.

and which MALUMA. If asked for reasons we may say that there is something sharp and jagged about TAKETE and likewise about the corresponding design, and the word MALUMA and the corresponding design are both soft and round. Yet the visual roundness is not the same as the auditory roundness. Why they are felt to go together according to the Gestaltists is because of their isomorphic relationship.

Arnheim presents one of the clearest pictures of the Gestaltists construct of isomorphism with a chart, which is reproduced in Table I, and a description of the same, which is summarized immediately below.

TABLE I

ISOMORPHIC LEVELS (AFTER ARNHEIM)

A.	OBSERVED PERSON	
I.	STATE OF MIND	psychological
II.	NEURAL CORRELATE OF I	electro-chemical
III.	MUSCULAR FORCES	mechanical
IV.	KINESTHETIC CORRELATE OF III	psychological
V.	SHAPE AND MOVEMENT OF BODY	geometrical
B.	OBSERVER	
VI.	RETINAL PROJECTION OF V	geometrical
VII.	CORTICAL PROJECTION OF VI	electro-chemical
VIII.	PERCEPTUAL CORRELATE OF VII	psychological

Suppose that person A performs a gentle gesture and it is perceived as such by person B. On the basis of psychophysical parallelism in its Gestalt version, it would be assumed that the tenderness of A's feelings (level I) corresponds to a hypothetical process in A's nervous system (level II), and that these two processes, the psychical and the physiological, are similar in structure, that is, they are isomorphic. These neural processes are then thought to direct the muscular forces which produce the gesture of A's arm and hand (level III). The muscular forces (level III) are assumed to be isomorphic with the physiological (level II) and the psychical (level I), and these three levels with the kinesthetic experience (level IV) of the forces. Level IV is thought to be not indispensible, but the structural kinship of the experienced gesture and the corresponding gentleness of mood would make A feel that his gesture is appropriate to his state of mind. The muscular forces (level III) would then cause A's arm and hand to move in a, say, parabolic curve (level V), and of course V is isomorphic with IV, III, II and I. The geometrical shape of the parabolic curve creates a visual pattern which transmits forces which are gentle in structure. At this point one could say that we know through past experience that a parabola looks more gentle than, say, a circle which looks more hard, or that we have learnt about the nature of the physical stresses and strains that produce the look of

gentleness or hardness. But the Gestaltists reject this associationist assumption (because associationism cannot account for the immediacy of the perceived expression, etc.), and claim that the forces transmitted (level V) are projected onto the retinae of B's eyes (level VI) which cause a configuration of electro-chemical forces in the visual cortex. Because B's psychophysical structures are also isomorphic he perceives the meaning (level VIII) of A's gentle gesture (level I). The construct of isomorphism cannot as yet be totally refuted. But, if we were to accept the construct and the corresponding belief that perception is in some way related to the electro-chemical configurations in the cortex, would they do justice to perceptual transactions as we have been reporting them. We rejected the variants of the associationist position for the same reasons that the Gestaltists did, namely, that the associationists conceived of perceptual activity as being caused by objects in the world over which the perceiver had no control and little comprehension. But to this linear equation of "forces emanating from the object," to use Hamlyn's[68] words, "the Gestaltists added forces in the cortex which interacted in a specifically causal way," hence perceptual activity is still being characterized as the end-product of a process of stimulation and not as something in which we actively engage.

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[68] D. Hamlyn (U. Toronto), The Psychology of Perception (1957), p. 58.

Moreover, implied in the Gestalt theory is the notion that the display on the cortex must finally be observed by "a little man in the head."[69]

There are other bases for doubt about the usefulness of the construct of isomorphism based on neurological studies.[70] Firstly, the size of the visual projection area which receives fibers from the foveal area of the retina greatly exceeds the size of the visual projection area receiving fibers from the rest of the retina. If we follow the Gestalt analysis this condition should produce distortion. Yet, our visual experiences do not seem distorted in this way. We do not see portions of figures in the center of our visual fields larger than other portions falling more on the periphery of the retina. Secondly, studies of electrical or physiological disturbance of the cortical tissue cast doubt on the construct. It has been pointed out that tumors and accidents of brain pathology in the visual areas do not produce the predicted disturbance.[71]

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[69] A. Koestler (10 Buckingham St., WC2, London), The Ghost in the Machine (1967), p. 10. It could be said that the Gestaltists accounted for everything in perception except the perceiver.

[70] R. Gregory (U. Cambridge), Eye and Brain (1966), pp. 34-59.

[71] D. Hebb (McGill U.), Organization of Behaviour (1949), pp. 280-289, and A. Luria (U. Moscow), Restoration of Function after Brain Injury (1963), p. 100 et passim.

A person suffering from an obstructive growth in the visual cortex does not believe that his visual world is reduced in size, only that his vision is poor.[72] In one study,[73] gold foil, an excellent conductor, placed across the visual projection areas of a chimpanzee trained in a visual discrimination problem did not interfere with the chimp's performance with the visual task. Gold pins inserted in the visual projection areas of another chimp did not interfere with his performance in the same task. These examples make it difficult to assume that the integrity of a configuration of electro-chemical activity in the visual cortex is essential to perception.

There are myriad examples of the inadequacy of the construct of isomorphism in the so-called area of perceptual dynamics. The Gestaltists would describe the perception of the objects in Figure 2 in accordance with their structural laws (extensity-intensity, figure-ground, etc.), but what these laws cannot state is that we are perceiving one bird flying to the left, and one bird flying to the right. In other words, over and above the structure of the visual pattern, and the Gestaltist's insights in this regard are not being denied, there are attributes of the pattern that

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[72] M. Critchley (U. London, England), Disorders of corporeal awareness in parietal disease, in S. Wapner and H. Werner, eds., The Body Percept, p. 79, et passim.

[73] K. Lashley (Yerkes laboratory, Orange Park, Fla.), An examination of the electrical field theory of cerebral integration, Psychol. Rev., 1951, 58:123-136.

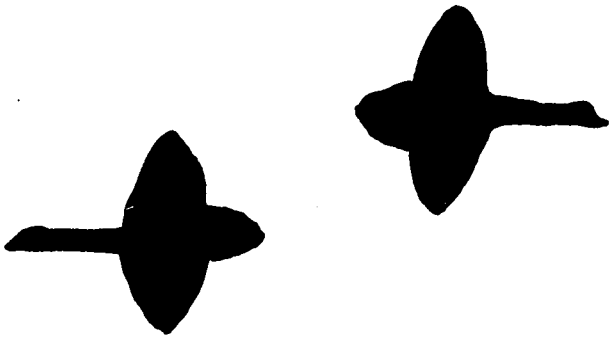

Figure 2. Two Birds in Flight

can best be described as visual dynamics; Viz., one may state that one bird has a directional quality to the left, and the other bird has a directional quality to the right. However, this description of the dynamics inherent in certain objects would remain at the phenomenological level[74] if there were no behavioural measure of its impact on us. Fortunately, one methodological variant of Wapner and Werner's body perception experiments[75] seems to get at this phenomenon.

In the basic experiment it was demonstrated that the physical location of the apparent median plane is significantly affected by the location of a test object.

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[74] Cf. R. MacLeod (Cornell U.), Phenomenology: a challenge to experimental psychology, in, T. Wann, ed., Behaviourism and Phenomenology (1964).

[75] H. Werner and S. Wapner (Clark U.), Studies in physiognomic perception: I. Effect of configurational dynamics and meaning induced sets on the position of the apparent median plane, J. Psychol., 1954, 38:51-65.

For example, if a S is secured in an upright position so that the various axes of his body:world are symmetrical, and the room in which the chair is located is darkened, and if a luminescent square is placed so that its left edge is fixated in the objective median plane, the S perceives the square as displaced to left; this means, the apparent median plane is now to the right. Similarly when the right edge is fixated the apparent median plane shifts to the left. In both instances, the amount of shift is measured by S instructing E to move the test object, which is set at a fixed distance and horizontal to Ss fronto-parallel plane, until he perceives it as straight ahead. In the case of perceptual dynamics experiments, the same procedure is kept but test objects deemed to have directional dynamics inherent in their structural pattern (planes, birds) were substituted. The general hypothesis that Wapner and Werner investigated in this latter case was: objects having horizontal directional dynamics to the left (to the right) will shift the apparent median farther to the right (to the left) than objects which do not have horizontal directional dynamics such as a square. The hypothesis was supported ($p < .01$). The writers concluded: (1) in the case of the basic design, that objects simply by their position in space may cause a change in the organismic state which is reflected in shifts of position of the apparent median plane; (2) in the case of perceptual dynamics, that objects

with these inherent properties also affect the perception of the apparent median plane; (3) in both cases, the object exerts a pull on the organism in the direction of the dynamics, this is counteracted by an organismic pull in the opposite direction; (4) because when stimuli are not commensurate with the existing state of the organism, there emerges a tendency in the organism to change its state in the direction toward the establishment of equilibrium between body and object; and (5) this tendency cannot be explained by topological patterns of isomorphism because the body shifts its own visual field in the direction opposite to that predicted by the structural laws of Gestaltism. In other words, the organism actively seeks an equilibrium with the world, not in terms of electro-chemical or other physical laws of correspondence, but in terms of the world as it is perceived. Objects "out there" may exert pulls, in proportion to the amount of inherent dynamism, location, etc., in different directions about the axes of the body, but these axes do not blindly correspond to the so-called objective axes of the world. Rather the axes are perceived in terms of the body-schema and <u>its</u> world.

Moreover, the essentially agenetic view of the Gestaltists cannot adequately account for the predictable regularities in the emergence of the body-schema. In a series of studies using another modification of their basic

design Wapner and Werner[76] inquired into the specific relation between the apparent location of objects "out there" and the apparent location of one's own body under different degrees of body tilt. The S, seated in a tilting chair in a darkened room, is required to carry out two tasks while he is tilted: (1) in the first task, a luminous rod is adjusted to the apparent vertical—in this way the Es obtained a measure of the changes in apparent position "out there"; (2) in the second task, the luminous rod is adjusted to the apparent physical position in which he experiences the longitudinal axis of his body to be located—in this way the Es obtained a measure of the way in which he perceives his own body in space. They found that as the body is tilted, apparent verticality and apparent body position deviate more and more, up to approximately 30° of body tilt. This increasing discrepancy between apparent and true position was interpreted as a reflection of the polarity of perception of body and of perception of outside space. Following from this finding, and with the assumption of an increase in polarization of body space and object space in ontogenesis foremost in mind, they proceeded to study 300 Ss between the ages of six and eighteen (the latter classified as adults) under the conditions of 30° left and 30° right body tilt. Their results are presented schematically in Figure 3. Note that: (1) as with the other studies on adults, the apparent vertical is rotated opposite to body tilt, i.e.,

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[76] S. Wapner and H. Werner (Clark U.), Perceptual Development (1957).

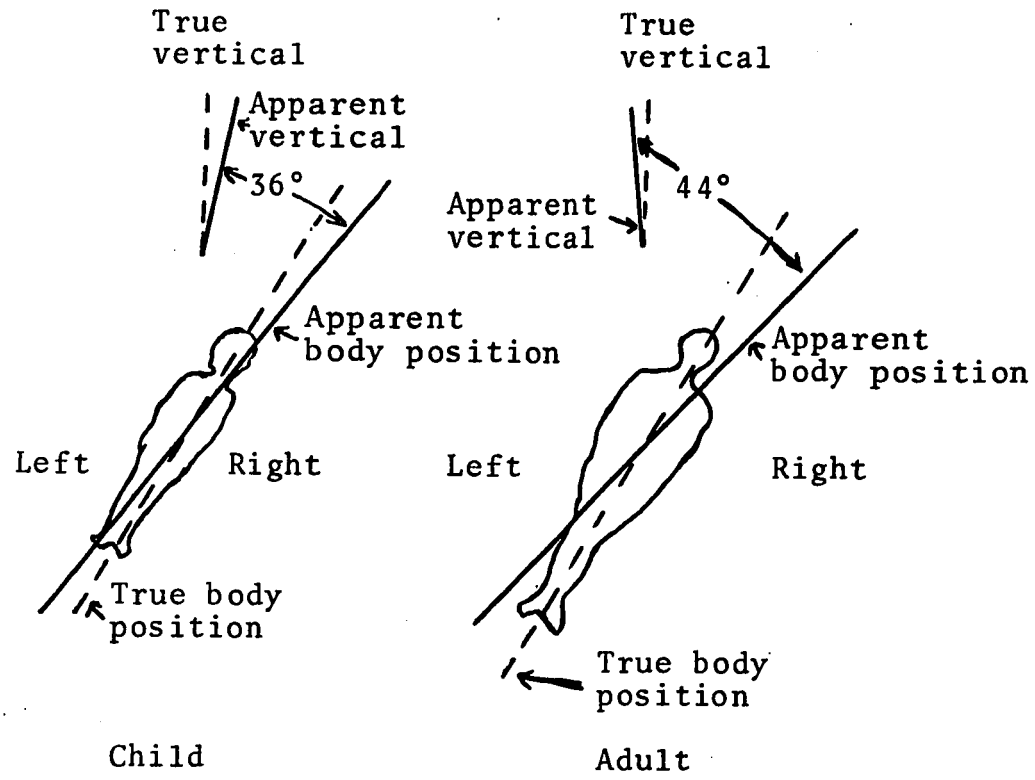

Figure 3. A diagramatic representation of apparent vertical and apparent body position for 30° right body tilt in child and adult (after Wapner and Werner).

with body tilt to the right the apparent vertical is rotated to the left; (2) but on the one hand the adult rotates the apparent vertical beyond body tilt, while on the other hand, the six-year-old rotates it short of body tilt, i.e., the adult establishes equilibrium by overcompensating while the younger child undercompensates; (3) the polarity between body space and object space is reflected in the angular discrepancy between apparent vertical and apparent body position; (4) the results support the assumption, the mean angular discrepancy between apparent vertical and apparent body position is 36° for the six-year-olds and 44° for the

adults. Not shown in this diagram is that the progression from 36° to 44° is not in regular increments as a function of age. Rather there is a sharp and discontinuous increase (of 5.5° or 69% of the total) in angular discrepancy in the twelve to thirteen-year-old age group. Such sudden changes are not atypical, they have been found in other areas of psychological functioning (mostly illusion studies) during development,[77] including our own experimental findings (see Chapter III). Wapner and Werner sum up the gist of their findings by affirming one of their (and one of our) fundamental constructs, namely, "in general there is an increase in polarization of body space and object space in ontogenesis."[78] In other words, the body-schema, the perception of the body in relation to the axes of its world emerges in ontogenesis; it is not a constant given equally to all age groups as the construct of isomorphism suggests; and as such, it is better characterized as the degree of body-flexibility, a degree that increases in ontogenesis.

Another contemporary theory, one which adheres neither to the associationist assumptions nor to the construct of isomorphism, but is in fact one of the original

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[77]See J. Wohwill (Clark U.), Developmental studies of perception, Psychol. Bull., 1960, 57:249-288, for a description and a list of these developmental shifts.

[78]Wapner and Werner, Perceptual Development, p. 100.

positions to advocate a body:world dialectic in psychology, is, The Rorschach Human Movement and Empathic Imagination Theory, of E. Schachtel.[79] We noted above that Schachtel refers to the phenomenon that we are calling participation as "kinesthetic empathy". For ease of readability Schachtel's usage has been retained in the pages immediately following.

As there were philosophers before Thales, there were no doubt Rorschach analysts who were aware of the phenomenon in question before Schachtel. However, Schachtel specifically addresses himself to the phenomenon in question. He states:

> In kinesthetic perception induced by visual perception of movement and leading to kinesthetic empathy, one ceases to remain a mere outside observer registering, like a camera, what goes on. Instead one experiences in himself the actual sensation of the movement, tension, or posture seen in the other person. While to the perceivers mind the kinesthetic perception is part and parcel of the global experience of seeing the other person move, the empathic, kinesthetic element in this perception is, nevertheless, the feeling of movement or rather of initial motor impulses in his body.[80]

Thus, for Schachtel, the perception of one's own body in the kinesthetic sensation is inextricably fused with the object perception through the visual data received by the eye. Because in this case kinesthetic experience is thought to be

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[79] Schachtel, Experimental Foundations of Rorschach's Test.

[80] Schachtel, Experimental Foundations of Rorschach's Test, p. 196. Cf. S. Stark (Michigan State U.), Experience, Rorschach responses, and rôle taking (i.e., empathy); a dualistic suggestion, Percept. Mot. Skills, 1968, 26:287-294.

felt together with another person actually performing the movement, Schachtel feels justified in speaking of a kinesthetic empathy.

> However, in those M responses (human or human-like or posture) in which the kinesthetic determinant is strong and in awareness, the S, in spite of his knowledge that he is looking at a static inkblot only, often has a similar subjective feeling as in kinesthetic empathy: as if he were experiencing in himself a movement or posture which seems to take place at the same time outside of him in the inkblot. The S feels the movement or the posture which to him seems to animate the inkblot. He experiences it as if he knew, not merely from outside but from within, how the human figure seen in the inkblot moves or holds its posture. It is as if he were, for a moment and to some extent inside the figure seen.[81]

Schachtel likens this kind of body experiencing to the kinesthetic sensations we feel when we observe a sprinter at the start of a race or a dancer holding an expressive pose; that is, we feel in our body how it would feel if we were in the place of the sprinter or dancer. He cites Wolff's[82] findings that 100% of his Ss recognized their own gait in motion pictures, and Allport's[83] writings concerning "the high importance of postural empathy in the process of self-recognition "as support for his conclusion that in "the kinesthetic experience of his own body and its way of

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[81]Schachtel, Experimental Foundations of Rorschach's Test, p. 197.

[82]W. Wolff (Bard Coll. Annandale-on-Hudson, N.Y.), The Expression of Personality (1943).

[83]Allport, Personality: A Psychological Interpretation.

moving the person has the only direct, immediate physical experience of himself from within."[84] However, the question to ask of Schachtel is: Do senses other than the kinesthetic provide us with the same kind of experiencing of the body?

Schachtel, in a remarkable shift from his more usual position on body:world perceptual activity, answers in the affirmative. But the other senses provide us with a less direct experience according to Schachtel. Hence implicit in Schachtel's thesis is the idea of kinesthetic and other types of empathy which are arranged in some sort of a hierarchy of efficacy. But such an arrangement would necessitate postulating various mediating mechanisms to explain their mutual interaction as well as their specific function in relation to the world. However such does not seem to be the intended meaning of Schachtel's answer. Because in another publication[85] he explains that as the organism emerges from its embeddedness its proximity senses (taste, smell, touch) decrease in efficacy[86] and its distal senses (eye, ear) increase in efficacy; i.e., the educational transformation relies more on the distal than on the proximity senses. The empathy associated with the proximity

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[84]Schachtel, Experimental Foundations of Rorschach's Test, p. 197.

[85]Schachtel, Metamorphosis, pp. 298-300.

[86]Schachtel feels that creative people retain the use of their proximity senses but that for most people they decrease in efficacy. See Moreno, op. cit., for one view of how the proximity senses can be reawakened.

senses decreases along with these senses and the empathy associated with the distal senses increases along with these senses according to Schachtel. This latter empathy, is, of course, the kinesthetic empathy. But even with this clarification Schachtel's thesis is still confusing. It is one thing to say that the proximity and distal senses are of differing import to the organism at different stages of development. Most developmentalists would agree. It is quite another thing to say that the different empathies associated with these different senses decrease and increase respectively. Apart from having to postulate two general developmental curves of empathy, one of decreasing frequency and another of increasing frequency, then within each general curve specific curves for each individual empathy, Schachtel would also have to develop a rationale explaining why and how individual senses have their own empathic mechanism in the first place. If Schachtel means that as the proximity senses become less efficacious the spectrum of stimuli they are sensitive to reduces in scope therefore the extent and the immediacy of experiencing the body via the data these senses provide is reduced, then there is no disagreement, because the experiencing of the body via the data of any individual sense is explainable as an individual manifestation of the general tendency of the body to mobilize to the meaning qualities of its behavioural field via whatever sense that meaning-quality is part of, and not as individual

manifestations in themselves. Even with this explanation, and there is every reason to assume that this is what Schachtel does mean, his thesis is still not free of confusion. By emphasizing that kinesthesis is the only direct source of experiencing the body he leaves his readers with the impression that adult empathy is kinesthesis. In effect this means that paraplegics would not be able to empathize—which seems unlikely.

Schachtel's description of the phenomenon is not in question, and the similarities to the position developed in this thesis are too obvious to belabour the point. We disagree only in that he has too closely identified the experiencing of the body with a singular sense modality. Although he has had considerable success with his descriptive analysis in clinical practice, it seems to be too narrowly conceived for a general theory of perception.

The next theorist, L. Lévy-Bruhl,[87] is not really a contemporary theorist, but he will serve to introduce the last contemporary theorist that specifically concerns us, namely, J. Piaget.[88]

Lévy-Bruhl, an early follower of Emil Durkheim, seems to have been the first social scientist to have used the term participation. He also postulated a law of

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[87]Lévy-Bruhl, Les Fonctions Mentales dans les Sociétés Inférieures.

[88]Piaget, Play, Dreams and Imitation; also, The Mechanisms of Perception.

participation. The gist of this law, which is more a description of the behaviour of the so-called primitive mentalities than a law per se, is that primitives tend to perceive things not on the basis of a subject-object dichotomy or of a causal relationship, but on the basis of a mystical belief that they are an integral part of the world. Lévy-Bruhl gives many examples of participation. For instance, he quotes von der Steiner regarding a striking case of participation among the Bororo of Brazil who "pride themselves on being red parrots."[89] In all cases of participation be it with a cloud, a tree, a flower, another person, etc., Lévy-Bruhl's overriding theme is that the perceiver feels himself to be one with whatever it is that is being perceived; viz, "the perceiver knows how the object feels not just from without but from within; he acts as if the perceived object is part of his self."[90]

Lévy-Bruhl's explanation of the as if phenomenon is that ways of perceiving are determined by collective representations or collective psychologies.

> In a primitive society the collective representations are characterized by the 'affective domain of the supernatural' and in a civilized society by the 'rational domain of the logical' . . . . These domains are the societal manifestations of either

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[89] Lévy-Bruhl, Les Fonctions Mentales dans les Sociétés Inférieures, p. 131.

[90] Lévy-Bruhl, Les Fonctions Mentales dans les Sociétés Inférieures, p. 25.

> 'the archaic or advanced' structures of the mind . . . . As societies evolve from mystical to logical and they begin to classify their knowledge, the mystical preconnections become less prevalent, and logic more dominant.[91]

It would lead us too far afield to criticize Lévy-Bruhl's sociological thesis.[92] Similarly, the issue of archaic and advanced structures of the mind, a fathomless issue, we leave to others.[93] However, we do affirm that collective representations, i.e., culture, greatly influences cognition. The recent study by Gay and Cole[94] is an excellent example of how a traditional culture, and in particular how the structure of its language, effects the type of cognitive complexity of a cultural group. But what studies like this one also show is that "a single course of cognitive development is not inevitable,"[95] and that we cannot use a single universe of knowledge (i.e., Western European, scientific-technical, mathematico-logical) to evaluate the relative stages of cognitive development of all people in all cultures. Lévy-Bruhl used such a universe of knowledge in evaluating the relative "amounts of logic"

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[91] L. Lévy-Bruhl (U. Paris), Les Carnets de Lévy-Bruhl (1949), p. 2.

[92] See C. Lévy-Strauss (U. Paris), La Pensée Sauvage (1962), for an analysis of Lévy-Bruhl's sociological thesis.

[93] C. Jung (C.G. Jung Inst., Zurich), The Undiscovered Self (1958).

[94] J. Gay and M. Cole (U. Liberia), New Maths in an Old Culture: A Study of Learning Among the Kepelle of Liberia (1967).

[95] Schmidt, op. cit., p. 133.

of different societies. There is little wonder that he concluded as he did. In addressing himself to Lévy-Bruhl's thesis, Lévy-Strauss states emphatically, in agreement with Gay's and Cole's findings, that "the primitive mind is as logical as ours, though as our own is only when it is applied to knowledge of a universe in which it recognizes physical and semantic properties simultaneously."[96]

Lévy-Bruhl's observation that the collective representations of primitive societies are characterized by supernaturalism or animism or anthropomorphism is well documented and it is not necessary to belabour the point. But—and here I am one with Werner—it is my belief that the anthropomorphic concept of nature is only a secondary phenomenon based on physiognomic perception. "Nature when it is known physiognomically is alive throughout, not because the soul, the vitality, is invested in the inanimate object, but rather because everything is understood to behave dynamically, quite apart from and prior to the differentiation between object and subject."[97] Whether the original physiognomic perception develops into a purely magical or an animistic daemonic or a religious-theistic view of nature depends on the specific structural level of the collective representations of the particular society

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[96]Lévy-Strauss, op. cit., p. 273.

[97]Werner, Comparative Psychology of Mental Development, p. 80.

according to Werner. In other words, Werner argues for a parallel developmental continuum in ethnogenesis (societal development) to the developmental continuum we have been arguing for in ontogenesis.[98] If this be the case, then Lévy-Bruhl's (beautifully) detailed examples of participations are just that—examples of participation as we have defined and described the phenomenon. The mystical interpretation that the primitives gave to their participations, because of their specific contemplative way of knowing the world, that Lévy-Bruhl interpreted as being the cause of participation, becomes understandable as an outcome of one way of knowing the expressions of the world. The mysticism supported and arose out of the participations, it did not strictly speaking determine their occurrence.

Piaget makes considerable use of Lévy-Bruhl's notion of participation as a primitive form of perception in which inner events are not distinguished from outer events but brings it into the more limited fold of psychology. Piaget feels that, as in the case of the participation phenomenon, where there is a convergence between the perceptions of the child and the perceptions of the primitive, that:

> . . . it is much easier to explain the latter by the general laws of infantile mentality than by reference to a mysterious heredity. Because however far we go into history the child has always preceded the adult and it can be assumed

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[98]Werner, Comparative Psychology of Mental Development, p. 24.

> that the more primitive a society the more lasting the influence of the child's cognitions on the individual's development, since such a society is not yet capable of transmitting or forming a scientific technology.[99]

There are a number of issues in Piaget's thesis that are at variance with the theme as we have been developing it.

On the one hand, Piaget is concerned with developing general laws of cognition by showing how the logic of biological structures continues into the logic of cognitive structures. This is an easier and more practical approach to understanding cognition than starting with collective representations and working backwards to biological structures according to Piaget.[100] For Piaget, as it is for us, the cognitive structure that corresponds to the biological structure that adapts the organism to its umwelt is the schema. On the other hand, Piaget's schema is not

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[99] Piaget, Play, Dreams and Imitation, p. 198. J. Bruner (Harvard U.), Studies in Cognitive Growth (1966), notes: "It is always difficult for the psychologist to think of anything existing in a culture. Psychology is in the main acultural and ahistorical in its theories. Kroeber's emphasis on the superorganic, Lévy-Strauss' insistence on structure in culture . . . are matters that are vaguely embarrassing to the working psychologist. We are, alas, wedded to the idea that human reality exists within the boundary of the skin," p. 321.

[100] An essay remains to be written on this theme in French intellectual thought. Lévy-Strauss and Piaget, to name but two, though apparently worlds apart philosophically, methodologically, and in their conclusions, yet both are consumed with how biological processes create a logic of nature and how the human intellect seeks and needs a similar modus operandi.

just "an implicit principle by which we organize experience," rather his schema is also underpinned by a specific abstraction, namely, the logic of Boolean algebra.[101] In other words, Piaget's schema has a specific universe of knowledge, a specific criterion to which it must conform even before it comes in contact with experience. It is important to grasp the significance of Piaget's conception of schema, because his understanding of participation directly follows from this conception.

In a more general vein, Piaget like Lévy-Bruhl uses a single universe of knowledge as the basis of his thesis, and as such is subject to the type of criticism we developed above with Lévy-Strauss, Schmidt, and Gay and Cole. Merleau-Ponty sums up the criticism thus:

> Piaget's logicism is an absolutization of our European culture—so also is his psychology which opens upon his logic, it is incompatable with ethnological experience, he has converted his perception into a cultural-Euclidean perception and ignores what is given in experience [such as expression]. The Euclidean perception has a privilege, but it is not an absolute privilege, it is but one aspect of the world.[102]

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[101] J. Piaget and E. Beth (U. Geneva), Epistémologie Mathématique et Psychologie (1961).

[102] Merleau-Ponty, Le Visible et l'Invisible, pp. 205-215. A number of articles which are being rushed into print as of late, articles such as R. Zaner (Trinity U.), Piaget and Merleau-Ponty: A study in convergence, Rev. Exist. Psychol. Psychiat., 1966, 6:7-23, showing the many parallels between the works of Piaget and Merleau-Ponty seem a little hasty. Piaget and Merleau-Ponty agree on the construction of the behavioural field but beyond that the parallels are few. Piaget's world is the world of a singular "genetic epistemology" while Merleau-Ponty's world is the "world as it is perceived" or "as it is given in perception." Cf. Schmidt, op. cit., p. 133.

To begin with a certain abstraction may be appropriate for a genetic epistemology. And it should be mentioned in this regard that Piaget cautions his readers that his works should be seen as an attempt to construct a genetic epistemology.[103] But Piaget, and especially some of his students, seem to ignore his own injunction by stressing the ubiquitousness of his general laws of cognitive development. There is more to cognition than knowing from the viewpoint of a single theorem. Expressions are part of cognition and there is no allowance for expression in the Boolean theorem. Piaget's search for a model upon which to base his analysis of perception is a point well taken. The question is should that model be the world as it is perceived or should it be an abstraction of the world. We have given numerous examples of the world as it is perceived concept, but to understand this concept that the world is for the individual his perceptions, it may be helpful to borrow a phrase from the semanticists. They have pointed out that words and symbols bear to the world of reality the same relationship as a map to the territory which it represents. This relationship also applies to perception and to reality. To the present writer it seems unnecessary to posit any concept of "true" reality. For the purposes of understanding perceptual phenomena, reality is, for the individual his perceptions, and expressions are part of that reality. This is not to say

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[103]Piaget and Beth, op. cit., p. XII.

that we ascribe to no standards of that reality. But there is a danger here. If we go too far in one direction, which Merleau-Ponty seems to do in his later works when he suggests that even the laws of mathematics are inseparable from perception, a relativism of fact which would vitiate the universal significance of any phenomenon,[104] then we plunge into the bottomless pit of metaphysics. If we go too far in the other direction, which Piaget does when he insists that reality is constructed in the form of a single theorem, then we end up with a dry-as-dust view of the world that does not allow for the givens of perception such as expression. Between this Scylla and Charybdis lies a standard of reality which is more suitable for a psychology of cognition, namely, the reality of the majority of the sane, sober, experienced, educated (and for the purposes of our experimental design) western European adults viewing the world under the freest and most favourable conditions.[105] This does not imply that these ideal perceivers have an absolute grasp on reality. It only implies that they agree, independently of each other, within reasonable confidence intervals, as to the meanings of a certain expression. This line of reasoning will not satisfy the metaphysically inclined. But a developmental psychology of cognition must

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[104] Merleau-Ponty, The Phenomenology of Perception, p. 397.

[105] Cf. Church, op. cit., p. 20, and D. Snygg and A. Combs (Florida State Coll.), Individual Behaviour: A New Frame of Reference for Psychology (1949), p. 20 et passim.

remain flexible and practical with the givens of perception serving as propaedeutics[106] to quantification and control of happenings, rather than rigid and of doubtful reliability.

In a more specific vein, and here we will attempt to confine our remarks to Piaget's views on participation, Piaget is one of the pioneer contributors to the concept of a body-schema. His understanding of the concept differs from ours only in that his dialectic between body:world is defined in terms of a logic. Piaget's perceiver is conscious of himself in relation to a logic of the world. Piaget's adult perceiver does not participatively know expressions in terms of his body-schema, seen as a body-schema that includes the possibility of perceiving the physiognomic meaning-qualities of objects, rather he contemplatively knows the meaning of objects in terms of his body-schema, seen as a body-schema that functions fully logically therefore having no need of the more primitive way of knowing. The primitive way of knowing is found in children and primitive peoples according to Piaget. He sees it as atrophying in ontogenesis as the child develops the ability to reverse his schemas (we return to this point immediately below) and as atrophying in ethnogenesis as the primitives develop a scientific technology. In other words, in both onto- and ethnogenesis the participative developmental continuum decreases in frequency with age and/or logical thinking and the

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[106]This term is being used as per MacLeod, op. cit., p. 54.

contemplative developmental continuum increases in frequency with age and/or logical thinking. On the one hand, Piaget's thesis, not with reference to our problem area but with reference to other problem areas that are likewise derived from his general viewpoint, has not been supported in certain ethnogenetic instances.[107] On the other hand, in the ontogenetic instance, he supports his statement that contemplative perception increases by showing the quantitative and qualitative changes in the child's ability to analyze and solve problems at successive stages of development. It should be noted: (1) that these problems, i.e., the conservation of number, length, magnitude, the inclusion of objects into a class, the grouping of classes, and so on, are all derived from Euclidean mathematics and as such should be seen as possible evidence supporting the idea of a development in cognition with reference to one form of cognition and not to all forms of cognition; and (2) that there is a considerable body of literature which questions the reliability of these findings.[108] But, as far as my review of the literature has revealed, he has not offered other than verbal support for his statement that participative perception decreases. To my knowledge, he has

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[107] P. Greenfield (Harvard U.), On culture and conservation, in, J. Bruner, ed., Studies in Cognitive Growth (1966).

[108] G. Kohnstamm (U. Amsterdam), An evaluation of part of Piaget's theory, Acta Psychol., 1963, 21:313-356, sums up this reliability issue.

presented no empirical support for this latter statement.

Since details of Piaget's general thesis are well documented,[109] let us briefly look at the specific issue in question.

Piaget proposes four stages of cognitive development: (1) the sensory-motor (roughly, ages 0-2); (2) the pre-operational (roughly, ages 2-6); (3) the concrete operational (roughly, ages 7-11); and (4) the formal operational (roughly, ages 12 and up). As the child progresses through the various stages he develops an increasing ability to reverse his schemas, that is, he develops "the permanent possibility of returning to the starting point of the operation in question."[110] In other words, he develops an increasing ability to see the logical whole of the operation from its beginning to its end or from its end to its beginning without being bound or fixed or centered on any part of the operation. This ability is fully developed only in the formal operations child. The child of an earlier stage possesses varying degrees of this ability, depending on his stage of development, hence his susceptibility to perceptual distortions such as participation. The child of an earlier stage cannot reverse the organismic, the assimilative face of the schema, by performing some mental operation, therefore

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[109] H. Maier (U. Minnesota), Three Theories of Child Development (1965); and B. Bain (U. Alberta), The Object Concept. Paper read at McGill Univ., Symposium on J. Piaget, 1969.

[110] Piaget, The Mechanisms of Perception, p. 283.

the schema is thought to be going out unchecked into the behavioural field so to speak. Since the schema is thought to be running wide open the child ascribes something of himself to the behavioural field; he does not simply experience phenomena, he "reads-off experience" (lecture de l'expérience); hence his inner events are not distinguished from his outer events, that is, he participates in the events of his behavioural field. Piaget explains an occurrence of participation at the sensory-motor stage:

> The meaning of the term 'bow wow' changed in a few days from dogs to cats to men. The method by which one object is related to another is therefore different in the case of the true concept (i.e., fully reversible schema) from that of the intermediary schema (i.e., irreversible schema) of this stage. In the case of the true concept, there is an inclusion of an object in a class and one class in another, whereas in schemas at this stage there is merely a subjective feeling of kinship (i.e., participation) which is the forerunner of the participations which are characteristic of the pre-concepts (i.e., irreversible schemas) of the next stages (i.e., preoperational, concrete operational).[111]

It soon becomes apparent however that what Piaget is talking about is not so much participation as a phenomenon in itself, which perhaps explains why he offers no empirical support for his assumption that it decreases in ontogenesis, but participation as another phenomenon that can be explained by his hypothesis of centration. He continues:

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[111] Piaget, Play, Dreams, and Imitation, p. 243. Piaget refers to participation at the sensory motor stage as "a subjective feeling of kinship," and participation at the pre- and concrete-operational stages as "participation". It is not clear what is implied by this difference in terminology.

> Confronted by various objects which he compares in order to arrange them in classes, the child who is on the threshold of the representative realm (i.e., contemplation) is capable of putting at the same level present data and the earlier data to which he assimilates them. According to his interests and the object that drew his attention at the starting point of his actions, he centers on this or some other element and assimilates the others to it. It is this irreversible assimilation which explains participation. . . . It is clear that the initial processes can only find their equilibrium in the direction of decentration. Decentration results in equilibrium between assimilation and equilibrium which of necessity tends toward a reversible schema (i.e., decentration results in a diminution of participation).[112]

Since Piaget is implying that centration and participation are somehow related, let us look at his hypothesis of centration.[113]

We have been stressing that perception is a cognitive activity. In the case of the body tilt experiments, we noted that perception is not directed toward successive approximations to the true body and true vertical positions, but that it constructs the world as perceived in such a way that it is in stable equilibrium with reference to a body-schema. Because of this explanation the developmental shift from under- to over-compensation in the child's perception of his body and his vertical is not seen as faulty perception, but as the normal ways the body constructs its world at different

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[112]Piaget, Play, Dreams, and Imitation, p. 243.

[113]Piaget, The Mechanisms of Perception, pp. 69-132.

stages of body-schema development. Piaget's hypothesis, on the other hand, is that perception is not a cognitive activity, rather perception is a pure centering (fixation, bound) on a stimulus configuration. Perception for Piaget is a mechanism (not a cognitive activity) that is bound to objects, as compared with a cognitive concept of perception, which actively constructs the world around it. Piaget also distinguishes two types of perception but he conceives of them in a different way.

Primary perception is the perception of an object as it is given in the first centration of attending to it. This perception may be, and often is, a deformed perception. Secondary perception is the perception of an object resulting from a series of comparative centrations or decentrations. The distinction between primary and secondary perceptions is the starting point of the hypothesis of centrations. According to this hypothesis the perceptual centration generates a perceptual deformation—"centration" being defined as the unification of various elements in perception—and examples of manifestations of perceptual deformation are, of course, participation, and "Set" as defined by Uznadze,[114] visual fixations, anticipations, egocentrism, and a host of other "intruding variables" that do not fit the logical scheme of things. The main feature

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[114]Uznadze, The Psychology of Set.

of this deformation consists of an overestimation of the central elements and an underestimation of the peripheral elements in the field of perception, for there is a maximum degree of perceptual assimilation at the center of an object, and a minimum degree of assimilation at its periphery. The decentration has a checking or regulatory effect, reducing the maximum and increasing the minimum by successive approximations or recentrations, and resulting in a more veridical perception. A theoretical model could be constructed, employing a theory of probability, to describe the degree of this perceptual regulation as a function of successive centrations. For this purpose the concept of encountering, which is the quantifiable counterpart of the qualitative concept of centration may be used. An encountering (rencontre) may be defined as a point of correspondence between the percept and the object. Thus in the case of the optical illusion there is a partial encountering of the corresponding set of points between the object and the percept; and in the case of the veridical perception there is a complete encountering (couplage). The concept of complete encountering is the psychological counterpart of the concept of geometric projection. Of course Piaget notes that there will never be a complete encountering in actual perception for the same reasons which we rendered the association assumptions untenable: namely, the percept is a function of the object and the perceiver. This concept then

may be simply considered as a part of a theoretical model which illustrates the assumed applicability of the calculus of probability to a genetic theory of perception. Thus if the aggregate of possible encounterings be represented by $\underline{N}$, and the actual encounterings be represented by $\underline{n}$, then the number of the remaining unencountered elements will be equivalent to $(\underline{N} - \underline{n})$. Let this remainder be $\underline{N}_1$, then the successive centrations will result in the encountering of only a part of it, $\underline{n}_1$, and the formula would repeat itself. The net result of these repetitions will be a logarithmic function corresponding to the empirical curves. Thus the hypothesis of centration is susceptible to a statistical representation.

The most noteworthy consequence of the hypothesis of centration, and the empirical basis for his statements concerning perceptual deformations, is the law of relative centration.[115] The law may be stated as follows: the relative distortion of a perceptual figure is equivalent to the ratio of the number of possible centrations to the number of actual centrations. That is:

Perceptual illusion = Aggregate of possible centrations: Aggregate of actual centrations

The law of relative centrations is similar to Weber's (and

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[115]Piaget, The Mechanisms of Perception, p. 83.

Fechner's) classic law

$$\frac{\Delta I}{I} = K$$

which states that the intensity of a stimulus (I) must be increased by a constant fraction (K) of its own value (Δ I) to approach the threshold of difference. For example, the weight of an ounce added to another ounce will be perceived far more readily than that of an ounce added to a hundred ounces. The significance is that Weber's law states that every objective difference is subjectively distorted; and Piaget's law, that the subjective distortion of the objective difference is a function of centrations.

Piaget reports a number of experiments in support of his hypothesis of centrations. Two[116] which are representative of this number are:

(1) J. Piaget, M. Lambercier, E. Boesch, and B. von Albertini (U. Genève), Recherches sur le développement des perceptions: I. Introduction à l'étude des perceptions chez l'enfant et analyse d'une illusion relative à la perception visuelle des cercles concentriques (Delboeuf), Arch. Psychol. Genève, 1942, 29:1-107.

(2) J. Piaget and M. Lambercier (U. Genève), Recherches sur le développement des perceptions: V. Essai sur un effet d' Einstellung survenant au cours des perceptions visuelles successives (Effet Uznadze), Arch. Psychol. Genève, 1944, 30:139-196.

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[116]Both these experiments are summarized by Wohwill, op. cit.

In both experiments the Ss were 40 Genevese school children divided equally into two age groups (5-6, 6-7) and 40 adults. In the first experiment the Ss were required to estimate the relative sizes of the Delboeuf concentric circles illusion (see Figure 4). Ss were required to estimate the size of A_1 relative to A_2 as B was varied in size. Piaget reported these findings: (1) the 5-6, and 6-7 groups exhibited a dominance of assimilative ($A_1 > A_2$) over contrast ($A_1 < A_2$) illusions; (2) the adult group exhibited a dominance of contrast over assimilative illusions, the percentage of these dominances were not reported, however they can be guessed at from the error figures (see Figure 5); (3) the assimilative and contrast illusions decrease with age; (4) the number of errors of illusion (inclusive of both types) decreases with age; and (5) the general shape of the error curve (see Figure 5) remains constant with age. For Piaget's purposes findings number 3, 4 and 5 are the most important. Since both assimilative and contrast illusions decrease with age, and since the shape of the errors of illusion curve is constant with age, Piaget feels justified in citing these findings in support of his hypothesis of centrations. In other words, not only did the children exhibit greater illusions than the adults, because of their inability to achieve perceptual decentration with as much facility as the adults, but also the errors of illusion, irrespective of the type of illusion, were logarithmically

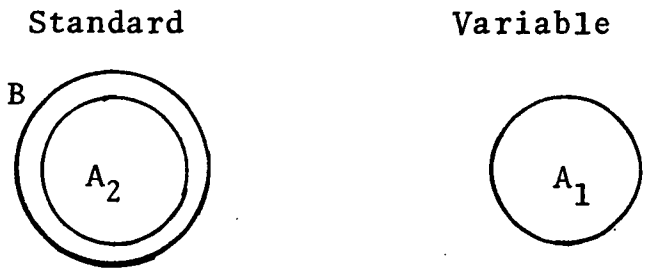

Figure 4. The Delboeuf Illusion

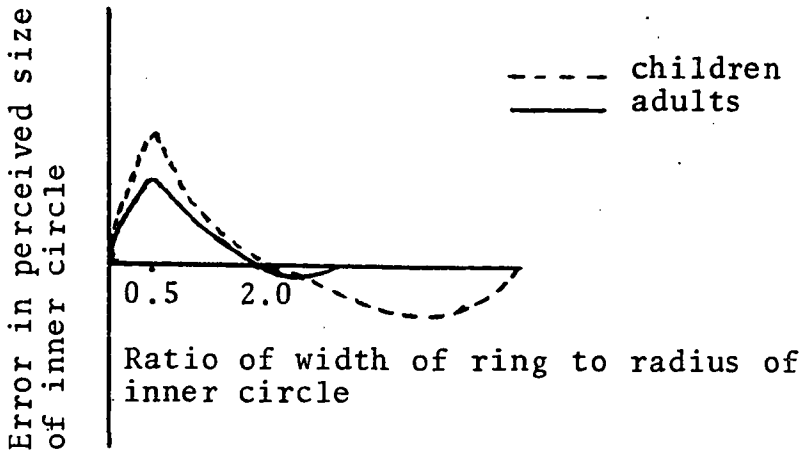

Figure 5. Strength of Delboeuf Illusion as a Function of the Relative Width of the Ring (after Piaget)

equivalent because of the law of relative centrations. The identical trend of results were found by Piaget in his second experiment using the Uznadze visual illusion. The details of this latter experiment are discussed in the experimental section. They are more suitably discussed in that section as we have used the Uznadze illusions in our study of the concept of body-flexibility. Let it suffice to note at this point that significant departures from Piaget's results were found.

Returning to the Delboeuf experiment, the most important findings for our purposes are the first two findings. The shift from assimilative to contrast illusion, a shift which Piaget only recorded but apparently felt to be of little import, is seen by this writer as a developmental shift comparable to the developmental shift found in the body tilt experiments. The shift may not be as obvious, because of the physical dimensions of the stimulus objects, methods of recording, type of task, methodology, etc., but it can be seen as another instance of having to perceive oneself in relation to something as opposed to having to mechanically decenter from points of the stimulus configuration. One reason for Piaget seeing little import in this shift is that if perception is conceived as being a mechanism controlled by a logical calculus of centration then "peculiarities" such as this shift and the host of other "intruding variables" must be due to a temporarily

deformed perception that will right itself when the child develops logical schemas for interacting with the world.

We have given a number of general and specific criticisms of Piaget's view of participation. However in closing this review of Piaget it seems appropriate to quote the words used by Kohnstamm at the close of his review of another part of Piaget's thesis:

> The aggressive tone in parts of the article might give the impression that we would like to see Piaget's theories definitely falsified by mysterious experiments. This is not true. Instead we hope to see an already impressive construct completed and repeatedly confirmed and provided fertile, because we are not blind to the immense need for such a basic frame of reference.[117]

In sum: (1) the assumptions underlying the rôle taking and the re-projection theories, the Gestalt theory of Arnheim, the Rorschach theory of Schachtel, and the participation theories of Lévy-Bruhl and Piaget were reviewed; and (2) in differing degrees and for differing reasons these positions were found to be wholly or partially at variance with our understanding of participation as a function of body-flexibility.

PART II

In this part the concern is with the empirical measures of participation as developed by other researchers.

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[117]Kohnstamm, op. cit., p. 353.

In this part the problem of terminology is also encountered. The problem is more acute with research work because most researchers make the names of their measures synonymous with what it is they are attempting to measure. To avoid the confusion that would arise from terminology changes in this context, and since the general nature of the problem area has been described in numerous places up to this point, it was felt that the specific terminologies used by the respective researchers should be retained in this part.

For ease of readibility. the norms, reliability figures, etc., are found in the experimental section and/or in the Appendices rather than in this part. (See pp. 122, 168).

The Expressive Lines

H. Lundholm,[118] seems to have been the first to study the phenomenon of expressive lines in a systematic fashion. He presented eight adult Ss with thirteen groups of synonymous adjectives (e.g., [1] Sad, melancholy, mournful, sorrowful; [2] Lazy, indolent, idle; [3] Gentle, mild, etc.) and asked them to draw lines expressive of the adjectives. Lundholm analyzed the lines into two categories: (1) type; and (2) direction; and further analyzed them into: (1) lines with only angles; (2) lines with only curves; and (3) lines with curves and angles. Lundholm reports "a remarkable unanimity between most of the lines and most of

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[118]H. Lundholm (Duke U.), The affective tone of lines, Psychol. Rev., 1921, 28:43-60.

the adjectives far above chance." Lundholm relied heavily on the works of Hugo Munsterburg[119] for his underlying rationale and concluded that his study "was evidence of a suggestiveness inherent in lines, and this suggestiveness is what the artist relies on to express his intentions."

Poffenberger and Barrows[120] modified Lundholm's procedure. They replaced the Lundholm's "suggestive lines" on one side of a page and the adjectives on the other. They required their 500 adult Ss to match the words with the lines. In a review of literature up to that time, Chandler[121] presents a table of the results of both experiments and notes that they "are essentially similar."

Walton[122] performed the first large scale developmental study in this area. He required 1800 children (200 per age group from 6 to 14) and 1000 adults to complete four types of tests: (1) a multiple choice test of matching descriptive adjective to expressive lines; (2) a list of

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[119] H. Munsterburg (Harvard U.), Principles of Art Education (1895).

[120] A Poffenberger and B. Barrows (Columbia U.), The feeling value of lines, J. Applied Psychol., 1924, 8:187-205.

[121] A. Chandler (U. California), A Bibliography of Psychological and Experimental Aesthetics: 1864-1937 (1938). Weber, op. cit. reports Cezanne as having said, upon hearing of these attempts to empirically understand the expressiveness of lines, "that science is telling us what children, primitives, and artists know instinctively—what an advancement!"

[122] W. Walton (1940 S. Main St., Los Angeles), Empathic responses in children, Psychol. Monogr., 1936, 48:40-67.

adjectives for each of which the Ss were required to draw an expressive line; (3) a series of nine expressive lines individually exposed to a S who was required to make a response in terms of how he would feel if he felt the way the line feels; and (4) a replication of Ruckmick's study[123] wherein Ss were required to describe facial expressions from photographs. Among a wealth of findings, Walton also reported an increase in the ability to perceive expression with age. Walton noted that test number three has the greatest potential, because it circumvents the forced choice issue and all the reliability and validity problems associated with that issue, but that it was difficult to administer because of the necessity of having either the S himself or a Judge record the S's responses. Walton's third test was replicated in this thesis. The methodological difficulty was overcome by taking down the S's responses on a tape recorder. This approach also seems more reliable when dealing with younger children who have yet to learn how to write or who mumble their responses since a permanent record is available that can be repeatedly referred to.

The Expressive Faces

The study of facial expression has a long history

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[123]C. Ruckmick (Ohio State U.), A preliminary study of the emotions, Psychol. Monogr., 1922, 3:30-35.

starting with the classic works of Lavater,[124] Darwin,[125] and Mantegazza.[126] Three works that collectively review the facial expression studies including the methodological problems in this area are:

(1) A. Jenness (Yankton Coll.), The recognition of facial expressions of emotions, Psychol. Bull., 1932, 29:324-350.

(2) P. Secord (U. Nevada), Facial features and influence processes in person perception, in R. Taguiri and L. Petrullo, eds., Person Perception and Interpersonal Behaviour (1958).

(3) J. Boucher (U. California), Facial displays of fear, sadness, and pain, Percept. Mot. Skills, 1970, 28:239-242.

Darwin, with his empirical bent of mind, seems to have been the first to have called attention to the methodological problem of selecting appropriate photographs expressive of certain emotions. The problem of selecting photographs waxed for years with numerous series of photographs, and even an artificial model[127] being put forward as possible solutions. The nuances of the problem can be read in Jenness. Although the problem will always be with us to a certain extent because of changes in hair style,

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[124] J. K. Lavater (U. Leipzig), Essays on Physiognomy (1789).

[125] Darwin, op. cit.

[126] P. Mantegazza (U. Rome), Physiognomy and Expression (1875).

[127] E. Boring and E. Titchener (Harvard U.), A model for the demonstration of facial expression, Amer. J. Psychol., 1923, 34:471-485.

clothes, etc., two solutions have been put forward which seem to be the best bets for the moment.

Ruckmick[128] published a series of thirty-four facial expressions of a female drama student. The particular emotions expressed in these photographs are generally regarded by most psychologists as being representative of the emotions Ruckmick claims they are. The general feeling as well as experimental evidence about the Frois-Wittman[129] photographs is similar. However, other psychologists[130] appropriately pointed out that the problem of a check list or verbal response associated with these photographs made them a less potent tool than they could be. Fields[131] offered a workable solution to the latter problem. Using photographs from both the Ruckmick and the Frois-Wittman series, Fields found twenty pairs that were matched in terms of the emotion being expressed, i.e., Ruckmick matched with Frois-Wittman. He attached half of these to a board and left the other half on individual cards. The Ss task of

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[128] Ruckmick, op. cit.

[129] J. Frois-Wittman (U. Paris), The judgement of facial expression, J. Exp. Psychol., 1930, 13:113-151.

[130] J. Bruner, D. Shapiro, and R. Tagiuri (Harvard U.), The meaning of traits in isolation and in combination, and L. Cronbach (U. Illinois), Proposals leading to analytic treatment of social perception scores, both articles in, R. Taguiri and L. Petrullo, Person Perception and Interpersonal Behaviour (1955).

[131] S. Fields (U. Arkansas), Discrimination of facial expression and its relation to social adjustment, J. Soc. Psychol., 1953, 38:63-71.

course was to match the loose photographs with those permanently on the board. One advantage of a non-verbal test of this nature is that it can be used by all age groups. Fields study was replicated in this thesis.

The Portrait Sensitivity Test

Woodworth,[132] in a factor analysis design, using various expressive faces, and expressive lines as his materials devised a six categories of emotions scale: (1) Love, mirth, happiness; (2) Surprise; (3) Fear, suffering; (4) Anger, determination; (5) Disgust; and (6) Contempt. All other emotions could be placed between these points of the continuum, but these categories represent equal intervals according to Woodworth. Scroggs[133] used Woodworth's categories as the basis of a test of portrait judgement. Scroggs had 150 adult Ss sort reprinted classical portraits into the six categories. Scroggs' study was replicated in this thesis with these modifications: (1) another norming study to check the reliability of Scroggs findings, since none had been reported; (2) one of the categories (disgust) was omitted because the two portraits reported to be representative of this category were not found to be sufficiently discriminating; and (3) the portraits were distributed into

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[132] R. Woodworth (Columbia U.), Experimental Psychology (1958).

[133] J. Scroggs, Empathy: Aesthetic and Interpersonal (Unpub. Ph. D. thesis, Yale, 1963); cf. J. Boucher, op. cit.

only two categories (happy, sad) by the younger children because a pilot study revealed that they did not know the distinctions between the six categories.

The Interview Situation

The testing situation in which a rater is asked to answer personality items in the way in which he would expect the other to answer was originated by H. Steinmetz.[134] Steinmetz suggested that psychological understanding of the other could be measured by the unorthodox use of tests already available. For example, following an interview with the other the rater might be required to fill out the MMPI as he would expect the other to fill it out. Another suggestion made was that a person appear before a group of Ss and give a short talk, after which the Ss might be required to respond as they thought the person would respond. Steinmetz also suggested that these procedures could be used in counsellor training, thus anticipating what has since become a major part of counsellor training.

Dymond[135] operationalized Steinmetz's suggestion by setting up groups of four Ss each and allowed them to get acquainted for ten minutes. Following this each S was required to fill out a four item Trait Rating Scale

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[134] H. Steinmetz (U. California), Directive psychotherapy: measuring psychological understanding, J. Clin. Psychol., 1945, 19:331-335.

[135] Dymond, op. cit.

constructed by Dymond. The Ss were instructed to: (1) rate self; (2) rate each of the others; (3) predict how each of the others would rate himself; and (4) predict how each of the others would rate him; on a five point scale of six traits: (1) superior-inferior; (2) friendly-unfriendly; (3) leader-follower; (4) shy-self-assured; (5) sympathetic-unsympathetic; and (6) secure-insecure. In this way Dymond obtained an objective measure of a S's ability to predict other's responses. Dymond saw this as an empathic ability.

However, there is reason to suspect the reliability of Dymond's findings,[136] as well as her underlying rationale, which seems to be a loose extension of Rogerian constructs. Allport[137] contends that Dymond and those who use her method of predicting the other's response are not measuring an empathic ability, they are instead measuring an ability to judge others. This ability to judge others must be distinguished from empathy which is strictly speaking an interaction process according to Allport. This distinction

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[136] G. Marwell (New York U.), Problems of operational definitions of "empathy", "identification", "projection", and related concepts, J. Soc. Psychol., 1964, 63:87-102; C. Patterson (U. Illinois), A note on the construct validity of the concept of empathy, Person. Guid. J., 1962, 40:803-806; and L. Cronbach (U. Illinois), Processes affecting scores on understanding of others, Psychol. Bull., 1955, 52:117-193.

[137] Allport, Pattern and Growth in Personality, p. 537.

has also been made by Bruner and Taguiri,[138] Bucheimer,[139] and Guerney, et al.,[140] all of whom call for an experimental design based on a dialogue or interaction between persons.

Blocksma,[141] a student of Rogers,[142] seems to have been the first to design such an experimental setting. He designed a simulated counseling interview involving a live interaction between a subject-counselor and an actor-client. In the interaction, the actor repeats a script, each script unit following the previous one regardless of what the subject says. Blocksma also devised a scoring system by which the subject could be evaluated. Although Cooper[143] recently used the Blocksma design on student counselors and reported satisfaction with the design, it seemed to us, based upon a pilot study, to be lacking in the spontaneity characteristic of genuine dialogue particularly with children. Therefore we decided to modify the Blocksma

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[138] J. Bruner and R. Tagiuri (Harvard U.), The perception of people, in G. Lindzey, ed., Handbook of Social Psychology, II (1961).

[139] A. Bucheimer (City U.N.Y.), The development of ideas about empathy, J. Counsel. Psychol., 1963, 10:61-70.

[140] B. Guerney, et al. (Rutgers State U.), A measurement of empathy in parent-child interaction, J. Genetic Psychol., 1968, 112:49-55.

[141] D. Blocksma, An Experiment in Counselor Learning (Unpub. Ph. D. thesis, Chicago, 1951).

[142] C. Rogers (U. Wisconsin), Client-centered therapy (1949).

[143] Cooper, op. cit.

design. We maintained the idea of an actor (actually we used an actress) but gave her more flexibility in her script. This nullified the Blocksma scoring system which is tied to an unvarying prepared script. In its place we substituted a slightly modified version of Guerney et al.'s Parent-Child Scale. This Scale is a simple seven point scale designed to evaluate spontaneous interaction between parent and child. Using two Judges to check for reliability we found this, in a pilot study, to be a reasonably good method of evaluating a S's apparent perception of the actress' intended meaning.

III

> Know then thyself, presume
> not God to scan;
> The proper study of mankind
> is Man.
>
> Pope, An Essay on Man

EXPERIMENTAL SECTION

General

The major purpose of this study was to investigate the postulate: Participation is a function of body-flexibility. It was expected that participation would increase as a function of body-flexibility. A number of questions and issues concerning the nature of the development of these variables were also addressed to in this study.

Essential Variables

(1) The independent variable is body-flexibility.

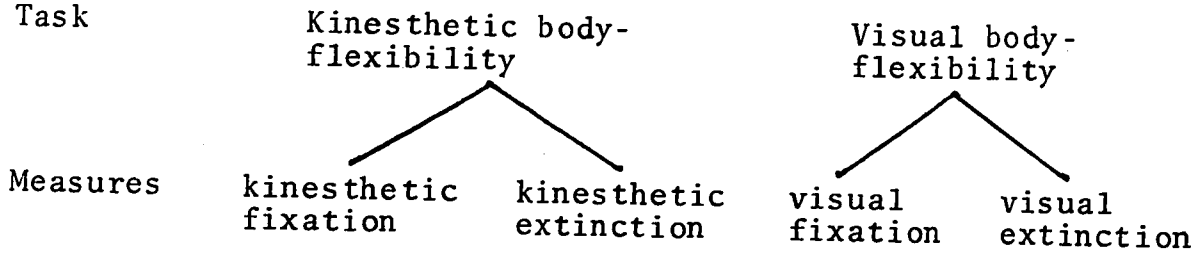
(2) The dependent variable is participation.

General Hypothesis

There is a significant positive relationship between performance on the body-flexibility tasks and performance on the tests of participation. The developmental interrelationships of the variables were considered in the interpretation of the results.

Definitions

(1) Body-flexibility was operationally defined in terms of trials to fixation and trials to extinction of: (a) the Uznadze kinesthetic illusion, and (b) the Uznadze visual illusion. To avoid any confusion which may have arisen from the close association of these illusions with Uznadze's theory of Set, the illusions were redesignated body-flexibility tasks. Therefore we have two types of body-flexibility tasks and two types of measures per task:



The fixation and extinction measures are complementary but they should be seen as tapping different aspects of the body-flexibility construct. The fixation side of the tasks should be seen in terms of the susceptibility to the illusions. The less the number of trials to acquisition of the illusions, the less the amount of conceptualized polarization of body:world; and the opposite. The extinction side of the tasks should be seen in terms of the ability of a S to distantiate himself from the illusion once he had acquired it. The fewer the number of trials to extinction of the illusions, the greater the amount of conceptualized ability of a S to perceive his body as the subject and the object of experience; and the opposite.

At this stage of development toward a theory of perception, it is not known if both types of measures are of equal import. The results of both types of measures of both tasks were presented, but the emphasis was placed on the extinction side of the tasks because there the consciousness a S has of his body in relation to the illusions can be more readily seen.

The assumption underlying this use of these illusions is that whatever else they may be used for,[1] they may also be used as measures of our construct of body-flexibility. They seem to be outstanding and easy to administer examples of the type of task described at the end of Chapter I. (See pages 19-20 for a summary statement of the B-f rationale.)

(2) Participation was operationally defined in terms of scores obtained on the four tests referred to above: (a) expressive lines; (b) expressive faces; (c) portrait sensitivity; and (d) interview situation. The assumption here is that these tests can be used as measures of participation. It was assumed that a S has to participate in the expressive lines to feel the way the lines feel, in the expressive faces to match the faces, in the expressions of

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[1]See J. Hritzuk (U. Calgary), Abstracts of major works on Set in Russian: Abstracts of publications on Set in English, Soviet Psychology, 1969, 2:7-20; M. Gulutsan and S. Sodhi (U. Alberta), Rigidity and Set in second language acquisition. Paper read at Romanian Academy of Science, 1968; and J. Piaget and M. Lambercier (U. Genève), Rercherches sur le développement des perception: V. Essai sur un effect d'Einstellung survenant au cours de perception visuelles successives (effet Uznadze), Arch. Psychol. Genève, 1944, 30:139-196, for other uses of the Uznadze illusions.

the portraits to categorize the portraits, and in the intended meanings of the actress' verbalizations and gestures to understand her verbalizations and gestures.

The Sample

The initial sample consisted of ninety-seven residents of the University of Alberta married students' residence at Michener Park, who were canvassed and volunteered to be Ss in a "study of aesthetic sensitivity among college students and children of college students." Eleven Ss did not complete all parts of the study, leaving the final scored sample at eighty-six Ss. The distribution of the final sample is shown in Table II.

TABLE II

DISTRIBUTION OF SUBJECTS BY GROUP, NUMBER, AGE, AND YEARS OF SCHOOLING

	Group					Total N
	5-6	7-8	9-10	11-12	Adult	
N	12	12	12	12	38	86
Mean Age	5.6	7.3	9.6	11.9	25.6	
Mean Years of Schooling	0.7	2.2	4.3	6.9	16.0[a]	

[a]This number is an estimate.

Other pertinent and control factors were:

(1) In each of the four children's groups, ages 5-6, 7-8, 9-10, 11-12, Ss must not have exceeded the age ranges. E.g., in the 5-6-year old group, a S must have had his fifth but not his sixth birthday.

(2) In the adult group there were no age restrictions. The age range ran from two Ss age fifteen to one S age fifty-six, with the remaining thirty-five Ss of this group clustering about the mean of 25.6 years.

(3) The rationales behind selecting these age groups were: (a) the five groups cover three of Piaget's developmental stages; not covered was the sensory-motor stage; (b) the 5-6 year old group was selected as the youngest age group because a pilot study revealed: (i) this to be the youngest age group capable of performing all parts of the study (the methodological variation for one test is described below); and (ii) that Ss younger than age five produced random (though interesting) results; (c) the 11-12 year old age group was selected as the cut-off point for childhood because: (i) it is the beginning of Piaget's formal operations stage; and (ii) Walton[2] found, using the expressive lines test, and we found, using the body-flexibility tasks, that the measurement curves of the 11-12 group and the adult group were developmentally contiguous;

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[2]Walton, op. cit., p. 56.

and (d) clearly defined age groups, with a gap of one year between the children's groups, were necessary for: (i) observing developmental change; and (ii) defining criterion for future replications of the study. Linearity of development between the groups was assumed.

(4) The size of the children's groups was based on the smallest number from which statistically reliable statements could be made.[3] The adult group was made larger in order: (i) to see more clearly the developmental outcome of the two variables; and (ii) to have a solid basis for making comparative statements about the children's groups.

(5) The final sample was equally divided by sex. Since no significant differences were found between sex the results were reported for the groups-as-a-whole.

(6) Ss with visual and/or perceptual-motor coordination impediments were excluded from the study.

(7) Ss whose mother tongue was not English were excluded from the study.

(8) The final sample of eighty-six Ss did not include: (a) twenty, 5-6 year olds and twenty adults used in a minor study (reported below) concerning the derivation of Piaget's and Lambercier's[4] results; (b) nor does it include

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[3]B. Winer (Purdue U.), Statistical Principles in Experimental Design (1962), pp. 14-45; and N. Downie and R. Heath (Purdue U.), Basic Statistical Methods (1959), p. 140.

[4]Piaget and Lambercier, op. cit.

the Ss used in the various pilot studies; however (c) all Ss used in the major and minor studies were drawn from the same population pool. No assumptions were made about the representativeness of this population pool to the population-at-large, since all Ss were students or spouses of students or children of students. It was assumed that they were homogeneous with respect to a sub-population, i.e., an English speaking student population.

Abbreviations

Body-flexibility -- B-f

Body-flexibility tasks -- B-f Ts

Kinesthetic body-flexibility task -- KB-f T

Visual body-flexibility task -- VB-f T

Kinesthetic fixation -- KF

Kinesthetic extinction -- KE

Visual fixation -- VF

Visual extinction -- VE

Expressive lines -- Exp Lin

Expressive faces -- Exp Fac

Portrait sensitivity -- Por Sen

Interview situation -- Int Sit

5-6 year old age group -- 5-6 gp

7-8 year old age group -- 7-8 gp

9-10 year old age group -- 9-10 gp

11-12 year old age group -- 11-12 gp

Adult group -- adult gp

All other abbreviations are C.P.A. standards.

THE MATERIALS

(1) KB-f T. Three spheres with handles each 88 mm. in diameter. One sphere weighed 190 gms., the other two weighed 69 gms. each. In other words, the three spheres were of equal volume but different weight (see Appendix A).

(2) VB-f T. Two slides: (a) one with two unequal circles, 20 mm. and 10 mm. in diameter respectively, and (b) one with two equal circles 14 mm. in diameter. One tachistoscope, Phi-electric, Model V-0959T, used as the slide changer (see Appendix B).

(3) Scoring Sheet used to mark: (a) trials to fixation, (b) trials to extinction, and (c) type of illusion, i.e., assimilative or contrast (see Appendix C).

(4) Exp Lin. The nine expressive lines were photostatically copied from Walton[5] and reproduced onto 2" x 2" visual projection slides. The reproduction work was done by the Audio Visual Department, University of Alberta. Other materials used with the Exp Lin test were: (a) a seven point scale used to evaluate Ss' responses; (b) a Kodak, Carousel Projector, Model P-3067C, used to project the Exp Lin; and (c) a General Electric Tape Recorder, Model R-481B, used to record Ss spontaneous responses to the Exp Lin (see Appendix D).

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[5]Walton, op. cit., p. 48.

(5) Exp Fac. This test is the personal property of Prof. S. Fields, Department of Psychiatry, University of Arkansas, and was graciously loaned by him for our study. The materials include nine of the Ruckmick pictures and eleven of the Frois-Wittman pictures mounted four each on five panels, and eleven Ruckmick and nine Frois-Wittman mounted on individual cards (see Appendix E).

(6) Por Sen. The materials for the Por Sen test consisted of: (a) twenty-four, 4" x 5", black and white reproductions of portraits painted by artists of different periods; they were obtained from Harvard University Prints, Cambridge, Massachusetts; and (b) five categories of emotion cards: (i) Love, happiness; (ii) Surprise; (iii) Suffering, fear; (iv) Anger, determination; and (v) Contempt (see Appendix F).

(7) Int Sit. A seven point rating scale used to evaluate a S's responses to an actress' intended meanings. A script for the actress to follow (see Appendix G).

Some Notes on the Materials

(1) The Uznadze kinesthetic illusion is similar to the Fechner illusion of weight. In place of Fechner's bench bound apparatus of hand clamps, springs, pulleys, and weights Uznadze designed three portable spheres of equal volume (88 mm.), and made two of them an identical weight (69 gms.), and made the third a different weight (169 gms.). To manifest the illusion, a S is blindfolded and simply

instructed to compare the weight of the two spheres, one placed in either hand. In the first comparison(s) the spheres are of different weights. In the subsequent comparisons one sphere is substituted. Thus, the S first compares spheres of unequal weight, a substitution is made without the S being verbally informed, and, the S then compares spheres of equal weight. In our terms, the S must treat himself as the subject and the object of the experience under two conditions, and his ability to distantiate himself from the objectively given stimuli under these conditions, i.e., trials to fixation and trials to extinction, were called measures of body-flexibility. The first comparisons are called fixation trials. The second comparisons are called extinction trials. During the extinction trials the illusion usually has a phasic nature: (a) It is first perceived as a contrast illusion, i.e., the hand into which the lighter sphere had been placed during the fixation trials is now perceived as holding the heavier sphere (when in fact the spheres are of identical weight). (b) It is subsequently perceived as an assimilative illusion, i.e., the hand into which the heavier sphere had been placed during the fixation trials is now perceived as holding the heavier sphere (when in fact the spheres are of identical weight). (c) It is finally perceived adequately, i.e., they are perceived as they are in fact.

The Uznadze visual illusion is analogous to the

Uznadze kinesthetic illusion. The S is still being conceptualized as having to experience his body-as-subject and body-as-object to perform the requirements of the illusion, only in this instance the modality concerned is visual. The procedure is more-or-less the same, only the stimulus dimension that varies is visual size, and the apparatus and instructions are modified for use with a tachistoscope.

The reliability figures for the kinesthetic illusion are difficult to come by. Uznadze[6] reports his figures in terms of percentage of Ss experiencing the illusion, at different ages, type of illusion, and so on, but gives no actual reliability figures. Our own reliability figures are reported below. For some reason or other the Uznadze haptic illusion (same weight, different volume) has been more popular in the West.[7] Since this latter illusion is analogous to the kinesthetic illusion, the reliability figures for it, quoted from Hritzuk,[8] are reported here:

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[6]Uznadze, The Psychology of Set, pp. 1-15.

[7]To this writer's knowledge, the study reported here is the first in the West to have used the Uznadze kinesthetic illusion. One reason for not using the more popular Uznadze haptic illusion was that the younger children's hands were not large enough to perceive the differences in the physical dimensions of the haptic spheres.

[8]J. Hritzuk, A Comparative and Experimental Application of the Psychology of Set (Unpub. Ph. D. thesis, Alberta, 1968), p. 101. Similar figures were reported by R. Hertzog, Set Characteristics of Linguistic Codes (Unpub. Ph. D. thesis, Alberta, 1968).

haptic fixation, rho .98; haptic extinction, rho .98. Hritzuk also reports reliability figures for the visual illusion: visual fixation, rho .98; visual extinction, rho .99. Piaget and Lambercier,[9] who used the Uznadze visual illusion in their study, gave no reliability figures. However, in light of our own results coupled with the others' it was assumed that both illusions were reliable.

(2) We noted above that the Exp Lin test was one of four tests administered by Walton.[10] The tests were: No. 1, drawing of lines in response to adjectives; No. 2, matching of word to line; No. 3, Exp Lin; and No. 4, S responded to what they felt the Ruckmick pictures were expressing. Walton reported significant correlations at $p < .05$, for all tests: Nos. 1-2, N 480, r .33; Nos. 1-3, N 440, r .32; Nos. 1-4, N 460, r .34; Nos. 2-3, N 612, r .53; Nos. 2-4, N 638, r .69; Nos. 3-4, N 613, r .52. His item analysis for the Exp Lin test ranged from r .18 to r .68. Walton's scoring key for the Exp Lin test, and his developmental norms were used in our study. As a double check we developed a seven point scale to evaluate the Ss' responses to the Exp Lin and had two Js score the responses for reliability. Walton's own reliability figures were: repeated measures, N 63, r .31; split half, N 98, r .56.

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[9] Piaget and Lambercier, op. cit.

[10] Walton, op. cit., pp. 56-67.

Walton also reported a developmental continuum of, in his terms, "empathic ability" (thus supporting Church), no sex difference, and no significant relationship to grades in school and grades in art.

(3) Fields[11] reported a correlation of r .24 ($p < .01$) between the Exp Fac test and the Bell Adjustment Inventory. No sex differences were found. Fields scoring key, based on 207 adult Ss, was used in our study.

(4) Scroggs[12] reported a correlation of r .24 ($p < .05$) between the Por Sen test and Sarbin's[13] Stick Figures Test. Scroggs' scoring key was modified, by doing a norming and reliability study, for use in our own study.

(5) Guerney, et al,[14] reported an interrater reliability score of r .80 for their Parent Child Scale. Our own interrater reliability figures for two Js on the Int Sit Scale are reported below.

THE METHODOLOGY

General

All proceedings were conducted in the kitchen of this writer's home. It was felt that this setting was more

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[11] Fields, op. cit., p. 69.

[12] Scroggs, op. cit., p. 100.

[13] T. Sarbin (U. California), Scoring Key and Stick Figures (1958).

[14] Guerney, et al., op. cit., p. 54.

conducive to a relaxing, natural atmosphere, and was particularly helpful in dealing with the children. The kitchen furniture was rearranged to accommodate the equipment yet maintain the naturalness.

All Ss were tested individually. The children had an introductory "get acquainted session". Their testing took place on subsequent days, and in some cases, two and three days were required to complete all the tests. The latter was necessary to control for fatigue. The majority of the adults completed the testing in one session.

The entire proceedings consisted of seven different tests. Six of the tests: KB-f, VB-f, Imaginal KB-f (an exploratory study described below), Exp Lin, Exp Fac, Por Sen; were randomized and presented accordingly to control for sequence effects, transfer of training, etc. The seventh test, the Int Sit, always came last. The rationale here being that following the obvious testing, a S would be requested to sit and have some refreshment. In this natural setting a conversation, which was in fact the Int Sit, would flow more easily.

The same E conducted all parts of the proceedings, including playing the role of the actress in the Int Sit. Four different Es acted as Js, independently of each other, in the two testing situations that required Js.

The Procedure and the Instructions

(1) KB-f T. A S was blindfolded, and seated with his hands resting on his thighs palms upward, and told:

> I am going to present two spheres to you, one in each hand. You may grasp them for a moment and then I shall remove them. I shall repeat this a number of times. Each time I do this, please tell me if they are equal or unequal in weight. If you think they are unequal in weight, tell me in which hand you feel the larger one.

In all tests the instructions were repeated and/or clarified in response to a S's query. Children who did not know left from right were told to indicate which hand or side they felt the heavier sphere. The sequence of presentation of the spheres was: 1, 2-3, 4-6, 7-10, 11-15, 16-20 trials to fixation. The criterion of extinction was operationally defined at five trials. The rate of presentation was .01 sec. on, and .02 sec. off.

(2) VB-f T. A S was asked to focus his eyes on the binocular part of the tachistoscope, and told:

> You will be shown two circles briefly. Each time you see the circles I want you to tell me if the circles are equal or unequal in size. If you think they are unequal, tell me which circle appears larger to you. Please be sure to tell me each time I flash the circles on the screen.

The sequence of presentation of trials to fixation, the extinction criterion, the rate of presentation was the same for both B-f Ts.

(3) The Imaginal KB-f T was an exploratory study. We attempted to find out if Ss could imaginally mobilize

their body such that they could experience the kinesthetic illusion. The rationale here was that if a S could imaginally mobilize his body such that he could experience the illusion, then we would have another measure of his ability to experience and direct the poles of his body. Understandably the instructions given here were very important. With the children we had to engage them in imaginal play ahead of time to find out what words: pretend, play, make-a-story, make-believe, etc., they individually used in imaginal activity. With the adults we had to go over the instructions and restate them in different ways. A S was blindfolded, seated with his hands resting on his thighs palms upward, and in general was told:

> I would like you to imagine as vividly as possible that you are lifting a very heavy ball in your right hand and a very light ball in your left hand.

There were no trials to fixation and extinction in this test. Either the illusion was manifested or it was not.

(4) Exp Lin. A S was seated directly facing a projection screen. A microphone was located nearby to record his responses. A test figure was flashed on the screen to: (a) allow the S to develop some expectancy of what was to follow; and (b) to adjust the focus of the projector to his satisfaction. The S was then told:

> I would like you to tell me how you would feel if you felt the way the line feels. Please answer as quickly as possible.

No exposure time was set for each line. If a S had difficulty with a certain line it was passed over and returned to at the end of this test. The nine expressive lines of this test were randomized following each presentation.

(5) Exp Fac. A S was seated at a table or on the floor if he preferred and told:

> I would like you to match this loose pile of pictures with those pasted on this board. All the loose pictures have a mate on this board. Please match all the pictures.

No time limit was set for this test. A S could rearrange the loose pictures as often as he liked until they were matched to his satisfaction. The twenty loose pictures of this test were randomized following each presentation.

(6) Por Sen. A S of the 7-8 gp, 9-10 gp, 11-12 gp, and adult gp was seated at a table or on the floor if he preferred in front of the five Woodworth category of emotion cards and asked if he knew the meaning of the words or not. If a S was not sure of the meaning of any word the Oxford Dictionary definition was provided for him. A S was then told:

> Under here are portraits of various people. I would like you to turn these portraits over one at a time and place them beside whichever card that you feel they go with. Please go by your first feeling and do them as quickly as possible.

For the 5-6 gp, the portraits were only categorized into "happy pictures" and "sad pictures", otherwise the procedure

was the same. The portraits were initially turned face down and turned face up by the S. No time limit was set for this test. The twenty-four portraits of this test were randomized following each presentation.

(7) Int Sit. Following the formal testing, it was announced that the testing had now finished, and the S was engaged in a discussion by the actress. The first five to ten minutes of the discussion were not noted. This served as a warm-up period. The following ten minutes were observed by two Js who were located in a nearby but innocuous location. The actress had two fundamental problems to discuss during the observed period: (a) not knowing if she should go to the grocery store or wait for an important phone call, and (b) her mother is coming to visit and she doesn't have a room for her to stay in. The Js evaluated the S's responses according to the Int Sit Scale.

THE RESULTS AND DISCUSSION

General

The presentation of the derived data was divided into three parts. In Part I, the results of the investigation into the nature of the development of the B-f variable were examined. A minor study concerning Piaget's and Lambercier's study (see pp. 88-91), and an exploratory study concerning the nature of the imaginal B-f variable were also included in this Part. In Part II, the results of the investigation into

the nature of the development of the participation variable were examined. In Part III, the interrelatedness of these two sets of results were examined. Individual profiles for each S in the form of scores obtained on each measure are presented in Appendix H. Because of the nature of the results, a detailed discussion was included with each individual result. A more general discussion follows in the next chapter.

PART I

Reliability

To ascertain the "coefficients of stability" of the B-f Ts a test-retest paradigm was designed. The statistic used was Pearson's 'r'. Ten Ss from each of the five age gps were randomly selected and tested, then retested. An interval of six to eight days transpired between testings. The conditions of appropriate interval between testing, rectilinear regression, and homoscedasticity of data were met.[15] The results for KF, KE, VF, and VE by gp are found in Table III. The B-f Ts produced acceptable stable measures for all gps.

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[15]Downie and Heath, op. cit., p. 217.

TABLE III

COEFFICIENTS OF STABILITY FOR BODY-FLEXIBILITY TASKS

	Groups				
	5-6	7-8	9-10	11-12	Adults
Kinesthetic Fixation	.91	.92	.99	.96	.98
Kinesthetic Extinction	.93	.93	.98	.94	.98
Visual Fixation	.74	.88	.98	.97	.98
Visual Extinction	.71	.86	.96	.93	.98

The VF and VE coefficients of the adult gp agree with the figures quoted by Hritzuk,[16] and the former were in exact agreement with the KF and KE coefficients of the same age gp. There were also some interesting trends. Generally, the coefficients increased for both tasks with age, that is, the B-f Ts became more stable with age. Note that the ranges of the KF and KE coefficients were .07 and .05 respectively, that is, for all practical purposes the KB-f T was equally stable for all gps. But, the ranges of the VF and VE coefficients were .24 and .27 respectively. Assuming equal distribution of data between gps, 75 percent of the .24 and 82 percent of the .27 were accountable to the

[16]Hritzuk, A Comparative and Experimental Application of the Psychology of Set, p. 101.

two youngest gps. Note the increases of .14 and .10 on VF, and .15 and .10 on VE for the 5-6 gp and 7-8 gp respectively. A plateau was reached with the 9-10 gp on the VB-f T which more-or-less levelled off thereafter. In other words, the KB-f T was equally stable for all gps, but the VB-f T was less stable for the 5-6 gp and 7-8 gp, and more stable for the 9-10 gp, 11-12 gp, and adult gp. The slight dip in the coefficient values for the 11-12 gp was assumed to be due to sampling.

Perhaps we can explain the differences in reliability between the KB-f T and the VB-f T at the younger age levels as follows. The KB-f T requires a S to use his body as an instrument in solving the problem of the kinesthetic illusion. This kind of use of the body as an instrument— as a tool— to cope with the surrounding world is original in childhood and is probably retained throughout ontogenesis as the basis of later cognitive development. Hence it is understandable why the KB-f T was highly reliable for all gps. The VB-f T does not require a S to actively cope with the visual illusion. The visual task requires a S to passively organize his visual field. It seems that the 5-6 Ss and 7-8 Ss have not yet learnt to use this distal sense modality to full advantage. Hence this type of a problem which requires a S to experience his body via this (experimentally isolated) modality is less reliable statistically at these younger age levels.

Development of B-f

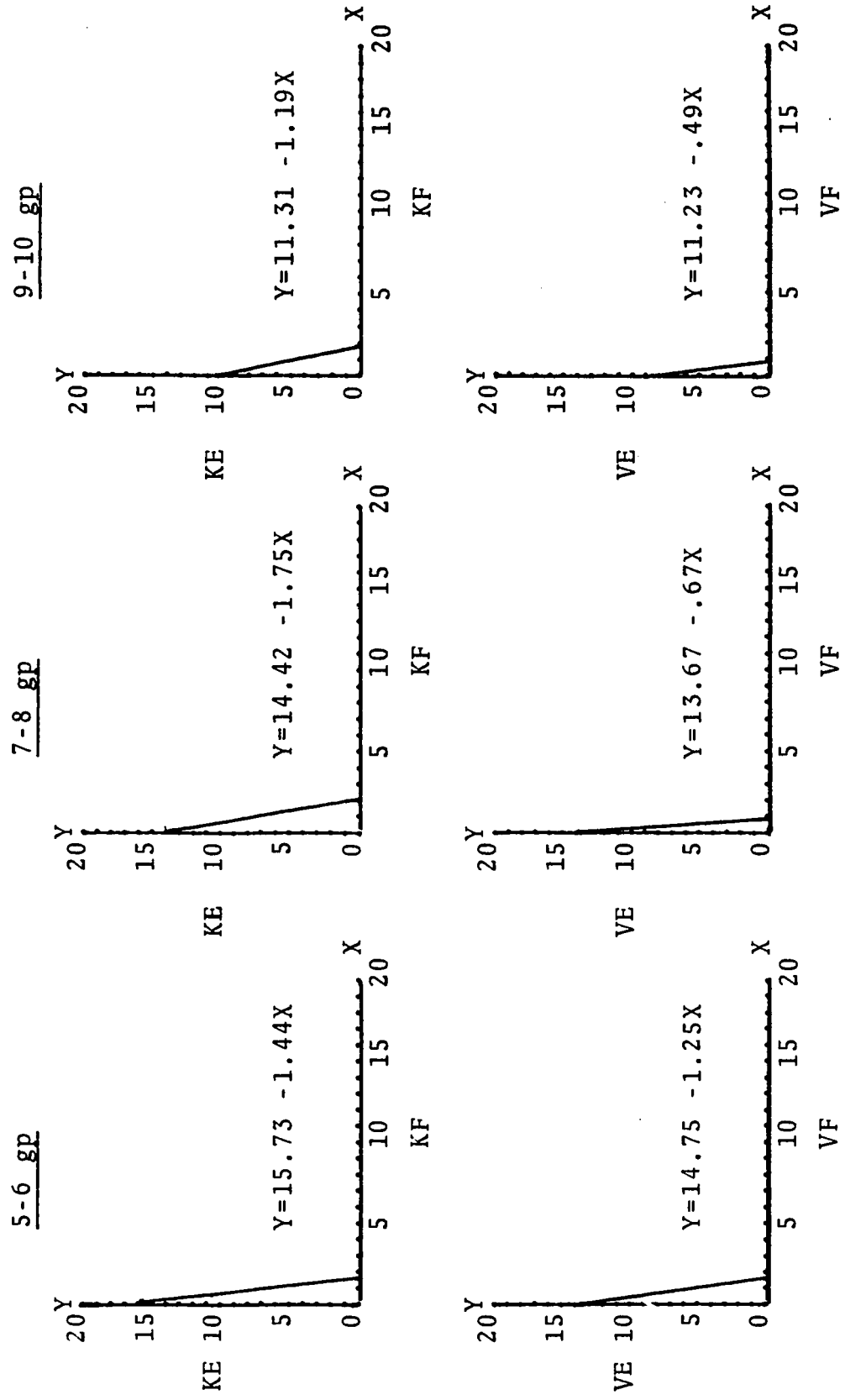
Means, standard deviations, and variances were determined for the KB-f and VB-f measures for the N of each gp. These results are found in Table IV. Individual Ss' results are found in Appendix H(i).

TABLE IV

SAMPLE MEANS, STANDARD DEVIATIONS, AND VARIANCES FOR BODY-FLEXIBILITY TASKS

		Groups				
		5-6	7-8	9-10	11-12	Adults
Kinesthetic Fixation	Mean	1.83	2.00	1.67	2.00	2.55
	S.D.	1.03	1.04	.93	1.04	2.50
	Var.	1.06	1.08	.86	1.09	6.25
Kinesthetic Extinction	Mean	13.08	10.91	9.33	7.83	6.87
	S.D.	2.06	2.31	1.67	1.40	.30
	Var.	4.24	5.33	2.79	1.96	.90
Visual Fixation	Mean	1.33	3.50	4.08	5.45	5.55
	S.D.	.25	2.01	1.78	2.50	2.44
	Var.	.63	4.04	3.17	6.25	5.95
Visual Extinction	Mean	14.17	11.33	8.92	7.17	6.24
	S.D.	1.99	1.67	1.62	1.03	.19
	Var.	3.97	2.79	2.62	1.06	.36

Table IV shows the same general trends for both tasks, that is, there was an increase in the mean number of trials to fixation with an increase in age, and a decrease in the mean number of trials to extinction with an increase in age. These trends can be seen graphically in the form of regression equations for KE from KF, and for VE from VF in Figure 6. These trends agree with the developmental trends


5-6 gp
Y=15.73 -1.44X
KE
KF
7-8 gp
Y=14.42 -1.75X
KE
KF
9-10 gp
Y=11.31 -1.19X
KE
KF
Y=14.75 -1.25X
VE
VF
Y=13.67 -.67X
VE
VF
Y=11.23 -.49X
VE
VF
0
5
10
15
20
X
Y

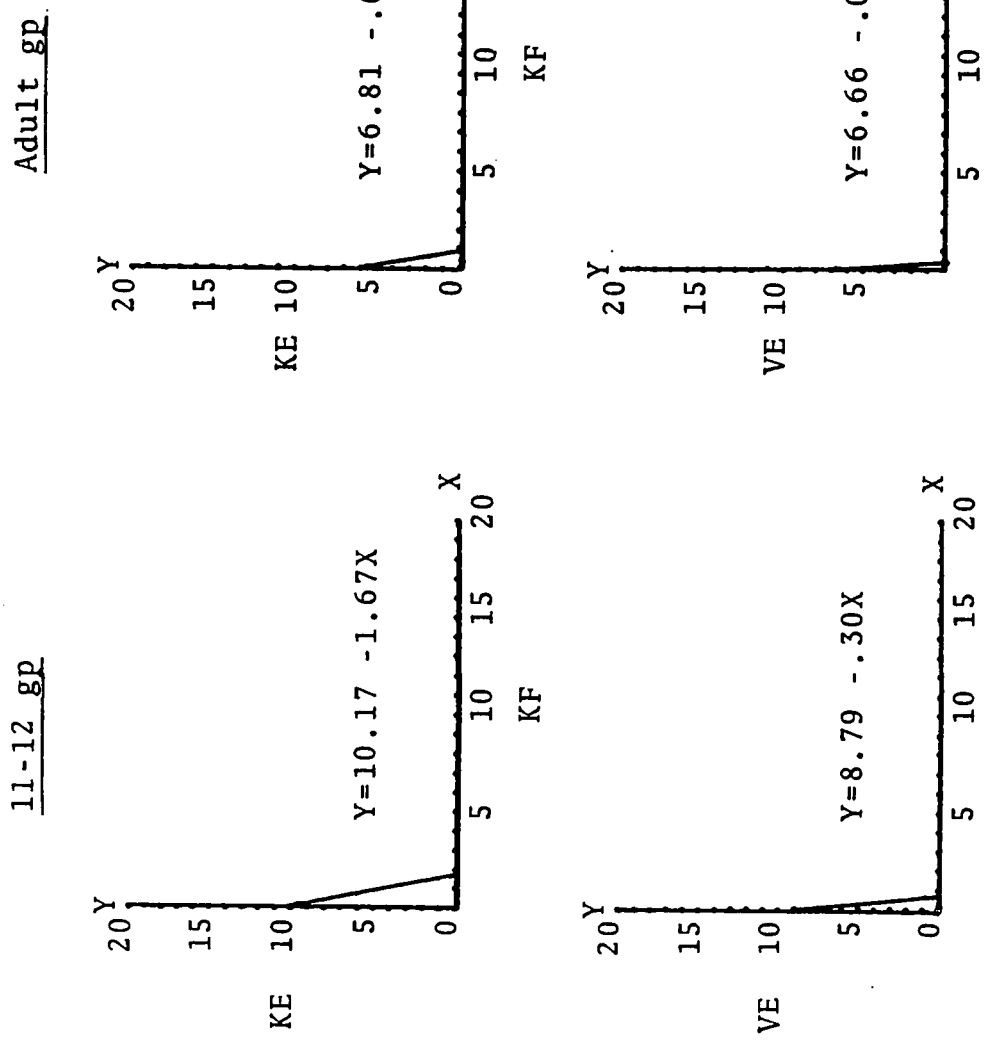


Figure 6. Regression Equations for KE from KF, and VE from VF by Age Group

reported by Uznadze.[17] Therefore the slight dip in KF scores for the 9-10 gp was assumed to be due to sampling. The numerical values of the means of the four measures for the adult gp are in close agreement with the values reported elsewhere.[18] Note the general tendency of the variances to parallel the means, in other words, the Ss in each gp were homogeneous with reference to each measure.

The adult gp KF mean of 2.55 is somewhat out of line with the regularity of these trends. This is because two Ss of the adult gp (Ss #49 and 84) had KF scores of 10, which means that they were 7.45 trials to fixation above the gp mean, and 4 trials above the remainder of the gp's range of R:1 to 6. With their scores partialled out the gp mean reduced to 2.17 which brought this score into line. S #49 also had a KE score of 10, which was 3.13 trials to extinction above the gp mean, and 2 trials above the remainder of the gp's range of R:6 to 8. S #84 had a KE score of 8, which was the upper limit of the latter range. No explanation of these anomalies is offered beyond the suggestion that these results may be due to personality differences which will have to be analyzed in future research.

Because the measures on these tasks are, statistically speaking, "repeated measures on one factor", the tests of

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[17] Uznadze, The Psychology of Set, pp. 1-15.

[18] Gulutsan and Sodhi, op. cit.; and Hritzuk, A Comparative and Experimental Application of the Psychology of Set.

significance used were the Analysis of Variance, with Repeated Measures on One Factor, coupled with the Scheffé A Posteriori Test for Comparison of Sample Means. The conditions for use of the analysis of variance: random sampling, homogeneity of variance [Bartlett's Test was used ($X^2 < .01$)], independence of gps; and the condition of a significant F for use of the Scheffé, were met.[19] Since the interaction effects of KF and KE, and VF and VE were being controlled for by use of the analysis of variance, and since the Scheffé is most conservative with respect to a type one error, the results were presented with considerable confidence. The analysis of variance for KF and KE, and the comparison of KF and KE sample means are found in Tables V, VI, VII, VIII, and IX respectively. The analysis of variance for VF and VE, and the comparison of VF and VE sample means are found in Tables X, XI, XII, XIII, and XIV respectively. Table XV presents the derived probability levels. An alpha level of .05 served as our level of acceptance.

Table V shows that with respect to the KB-f T, the derived F ratios were significant at $p < .01$ for the 3 Fs. Since these overall Fs were significant, that is, since there were overall differences between gps in their respective performances on the KB-f T, the analysis of the

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[19]Winer, op. cit., pp. 140-318; and Downie and Heath, op. cit., pp. 176-188.

TABLE V

ANALYSIS OF VARIANCE FOR KINESTHETIC FIXATION AND KINESTHETIC EXTINCTION FOR ALL GROUPS

Source	SS	DF	MS	F[a]
Between Subjects	324.91	85		
Between Groups	145.71	4	36.43	17.02**[b,c]
Subjects Within Groups	173.38	81	2.14	
Within Subjects	2440.00	86		
Between KF & KE	2005.65	1	2005.65	554.72**
Group KF & KE Interaction	201.37	4	50.34	13.92**
KF & KE Subjects Within Groups	292.86	81	3.62	

[a] F .95 (1,81) = 3.96
F .95 (4,81) = 2.48

b* $p < .05$

c** $p < .01$

TABLE VI

SIMPLE MAIN EFFECTS FOR ALL GROUPS ON KINESTHETIC FIXATION

Source	SS	DF	MS	F
Groups for KF	14.98	4	3.75	1.30
Within Cell	466.25	162	2.88	

F .95 (4,162) = 2.43

TABLE VII

SCHEFFÉ MULTIPLE COMPARISONS FOR SAMPLE MEANS ON KINESTHETIC FIXATION

Group		7-8	9-10	10-12	Adults
Group	5-6	NS	NS	NS	NS[a]
	7-8		NS	NS	NS
	9-10			NS	NS
	11-12				NS
	Adults				

F .95 (4, 162) = 2.43

[a] NS denotes not significant.

[b] Adjacent gps are read off the oblique and alternate gps are read off the horizontal of the Scheffé Tables.

TABLE VIII

SIMPLE MAIN EFFECTS FOR ALL GROUPS ON KINESTHETIC EXTINCTION

Source	SS	DF	MS	F
Groups for KE	426.08	4	106.52	36.98**
Within Cell	466.25	162	2.88	

F .95 (4,162) = 2.43

TABLE IX

SCHEFFÉ MULTIPLE COMPARISONS FOR SAMPLE MEANS ON KINESTHETIC EXTINCTION

Group		7-8	9-10	11-12	Adults
Group	5-6	*	**	**	**
	7-8		*	**	**
	9-10			*	**
	11-12				NS
	Adult				

F .95 (4,162) = 2.43

TABLE X

ANALYSIS OF VARIANCE FOR VISUAL FIXATION AND VISUAL EXTINCTION FOR ALL GROUPS

Source	SS	DF	MS	F
Between Subjects	236.50	85		
Between Groups	68.03	4	17.01	9.19**
Subjects Within Groups	149.95	81	1.85	
Within Subjects	1882.50	86		
Between VF & VE	1084.84	1	1084.84	244.95**
Group VF & VE Interaction	673.45	4	168.36	38.01**
VF & VE Subjects Within Groups	358.74	81	4.43	

F .95 (1,81) = 3.96

F .95 (4,81) = 2.48

TABLE XI

SIMPLE MAIN EFFECTS FOR ALL GROUPS ON VISUAL FIXATION

Source	SS	DF	MS	F
Groups for VF	986.61	4	246.65	7.86**
Within Cell	508.70	162	31.40	

F .95 (4,162) = 2.43

TABLE XII

SCHEFFÉ MULTIPLE COMPARISONS FOR SAMPLE MEANS ON VISUAL FIXATION

Group		7-8	9-10	11-12	Adults
Group	5-6	NS	*	**	**
	7-8		NS	NS	NS
	9-10			NS	NS
	11-12				NS
	Adults				

F .95 (4, 162) = 2.43

TABLE XIII

SIMPLE MAIN EFFECTS FOR ALL GROUPS ON VISUAL EXTINCTION

Source	SS	DF	MS	F
Groups for VE	6368.32	4	1592.08	50.70**
Within Cell	508.70	162	31.40	

F .95 (4, 162) = 2.43

TABLE XIV

SCHEFFÉ MULTIPLE COMPARISONS FOR SAMPLE MEANS ON VISUAL EXTINCTION

Groups		7-8	9-10	11-12	Adults
Groups	5-6	**	**	**	**
	7-8		**	**	**
	9-10			*	**
	11-12				NS
	Adults				

F .95 (4,162) = 2.43

TABLE XV

SCHEFFÉ MULTIPLE COMPARISONS FOR ALL GROUPS ON ALL FOUR MEASURES IN TERMS OF THE DERIVED PROBABILITY LEVELS

	Groups	7-8	9-10	11-12	Adults
Kinesthetic Fixation	5-6	.999	.999	.999	.800
	7-8		.993	.999	.913
	9-10			.993	.648
	11-12				.913
	Adults				
Kinesthetic Extinction	5-6	.024	.000	.000	.000
	7-8		.018	.000	.000
	9-10			.023	.000
	11-12				.072
	Adults				
Visual Fixation	5-6	.210	.054	.000	.000
	7-8		.979	.329	.096
	9-10			.687	.388
	11-12				.999
	Adults				
Visual Extinction	5-6	.000	.000	.000	.000
	7-8		.000	.000	.000
	9-10			.026	.000
	11-12				.296
	Adults				

specific differences was justified. We noted in Table IV the general trend of from less to more trials to KF with an increase in age. Tables VI and VII show that the differences between each age gp's KF mean were not significant. Similarly, we noted in Table IV the general trend of from more to less trials to KE with an increase in age. Tables VIII and IX show that the differences between the adjacent children's gps KE means were significant at $p < .05$ for the three comparisons, but that there was no significant difference between the 11-12 gp and the adult gp KE means. Note in Table XV, that if our level of acceptance had been set at .07 instead of at .05, then the KE mean difference between the last of the children's age gps and the adult gp would have been on the border line of significance. Table IX also shows that there were significant differences between the alternate age gps KE means, the probabilities of which can be found in Table XV.

In sum: (1) there was a slight face value trend of an increase in the mean number of trials to KF with an increase in age, but there were no significant differences between the KF means, and (2) there was a definite face value trend of a decrease in the mean number of trials to KE with an increase in age, the differences between the KE means of each of the adjacent children's gps were significant, but this latter trend reached a plateau between the 11-12 gp and the adult gp.

Table X shows that with respect to the VB-f T, the derived F ratios were significant at $p < .01$ for the 3 Fs. Since these overall Fs were significant, that is, since there were overall differences between gps in their respective performances on the VB-f T, the analysis of the specific differences was justified. We noted in Table IV the general trend of from less to more trials to VF with an increase in age. Tables XI and XII show that the differences between each adjacent age gps VF mean were not significant. Table XII also shows that the differences between the alternate age gps VF means, with the 5-6 gp as a constant, were significant, the probabilities of which can be found in Table XV. Similarly, we noted in Table IV the general trend of from more to less trials to VE with an increase in age. Tables XIII and XIV show that the differences between the adjacent children's gps VF mean were significant at $p < .01$ for the 5-6 gp: 7-8 gp, and 7-8 gp: 9-10 gp comparisons, and $p < .05$ for the 9-10 gp: 11-12 gp comparison, but that there was no significant difference between the 11-12 gp and the adult gp, VE means. Note in Table XV the rise from .000 with the 5-6 gp: 7-8 gp and 7-8 gp: 9-10 gp comparisons to .026 and .296 for the 9-10 gp: 11-12 gp and 11-12 gp: adult gp comparisons respectively. In other words, most of the large F of Table XIII was taken up by the two youngest age gps. This finding was not surprising in light of the results shown for the

coefficient of stability in Table I-II. Table XIV also shows that there were significant differences between the alternate age gps VE means, the probabilities of which can be found in Table XV.

In sum: (1) there was a face value trend of an increase in the number of trials to VF with an increase in age, but there were no significant differences between the adjacent gps VF means; and (2) there was a definite face value trend of a decrease in the mean number of trials to VE with an increase in age, the differences between the VE means of each of the adjacent children's gps were significant, but this latter trend reached a plateau between the 11-12 gp and the adult gp.

In general, it can be said that B-f, in the two modalities it was measured, and as it was measured, increased with age, that is, the ability of a S to perceive his body as the subject and the object in relation to the dynamics of the kinesthetic and visual illusions increased with age in a regular, and as shown in Figure 6, predictable fashion. It was concluded that there is a regular and lawful developmental continuum of B-f.

Further Findings

It was not possible to compare the fixation and extinction curves of the respective measures in a point for point manner. Although the measurement curves of both tasks were similar in shape, it is not known at this stage of

theoretical and measurement development if a score of one trial on the KE curve is equal to a score of one trial on the VE curve. The same lack of knowledge prevails with reference to the fixation curves. We know from Hritzuk's[20] work that intramodal transfer produces reliable results, but we still do not know if the scores represent equal distances on the equivalent curves. It is reasonable to expect that since the dominant sensory modality concerned, the kind of information being processed, the sensory dimensions of the apparatus, etc., of each task is different, that the specifics of the curves at different stages of development would represent differentially organized cognitive structures. Therefore we had to proceed cautiously at this stage. However we were not entirely groping in the dark, because in addition to the results already shown, the curves also represent like ways of perceiving the body in relation to conceptually and methodologically analogous apparatus, and as such, produced interesting if in some instances anecdotal findings.

For example, Table IV shows that at the 5-6 gp end of the developmental continuum the KF mean exceeded the VF mean by 0.50 trials, while at the adult gp end, the VF mean exceeded the KF mean by 3.00 trials. In other words, the 5-6 gp were less susceptible to the acquisition of the

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[20]Hritzuk, A Comparative and Experimental Application of the Psychology of Set, p. 104.

kinesthetic illusion relative to the visual illusion, while the adult gp were less susceptible to the visual illusion relative to the kinesthetic illusion. One explanation for this change-over may be that the adult has had greater experience with this distal sense and therefore he is less susceptible to the visual illusion. This explanation is also supported by the fact that this change-over first occurred at the 7-8 gp (VF mean > KF mean by 1.50 trials), and Table II shows that this gp had a mean of 2.2 years of schooling (most school work requires the use of the distal senses) as opposed to a mean of 0.7 years for the 5-6 gp. However, these findings can only be seen as suggestive of the kind of cognitive dynamics which may be dominant in the cognitive structures at different stages of development because of the factors noted in the preceding paragraph and because the differences between the fixation means of the respective tasks were not significant.

In sum: (1) it seems that there was less polarization of body:world with reference to the VB-f T as compared to the KB-f T for the 5-6 gp; (2) this relationship changed over with the 7-8 gp and gradually increased in numerical value relationship up to the adult gp; and (3) educative factors were suggested as a possible influence in this change over.

The extinction curves show the opposite, though predicted set of relationships. Not only did the successive

age gps take fewer trials to distantiate from the respective tasks, but at the 5-6 gp end of the developmental continuum the VE mean exceeded the KE mean by 1.09 trials, while at the adult gp end, the KE mean exceeded the VE mean by 0.63 trials. In other words, the 5-6 gp were less able to perceive themselves in relation to the previously acquired visual illusion relative to the kinesthetic illusion, while the adult gp were less able to perceive themselves in relation to the previously acquired kinesthetic illusion relative to the visual illusion. Only in this instance the change over occurred with the adult gp, the remainder of the KE and VE curves closely parallelled each other. One explanation for this change over occurring much later than the fixation change-over, is that on the one hand, the child learns early to perform simple visual discrimination tasks, so that following two years or so of schooling he becomes less susceptible to a visual task of this type. On the other hand, it seems that his ability to organize his visual field including himself as the object and the subject of this visual task, in the passive manner required by this task, is only developed much later.

In sum: (1) it seems that there was less distantiation of the VB-f T relative to the KB-f T for the 5-6 gp, and vice versa for the adult gp; and (2) a combination of educative factors and type of task were suggested as possible explanations of these occurrences.

These findings were supplemented by examining the individual S's profiles. The latter are found in Appendix H(i).

The Ss of a given gp who took more trials to fixation usually took less trials to extinction, that is, Ss who scored above their gp's fixation mean usually scored below their gp's extinction mean. For example, Ss #3, 5, 9, 11, and 12 all took three trials to KF, or they all scored 1.17 trials above their 5-6 gp's KF mean; and they took 11, 12, 11, 11, and 12 trials to KE respectively, or they collectively scored 1.50 trials below their 5-6 gp's KE mean. Moreover, note that the same Ss took 3, 1, 3, 1 and 1 trials to VF respectively, or they collectively scored 1.50 trials above their gp's VF mean; and they took 12, 13, 12, 13, and 13 trials to VE respectively, or they collectively scored 2.00 trials below their gp's VE mean. The singular outstanding reversal of this pattern was S #49 of the adult gp, the reversal occurring on his kinesthetic scores only. In other words, in general, not only were there developmental differences in B-f between age gps, but: (1) there were also individual differences within age gps; (2) these differences separated the good from the poor performers, a point which is returned to below with reference to performance on the tests of participation; and (3) since the scores not only tended to complement each other within a task (> KF < KE) but also between tasks (> KF > VF, < KE < VE),

we were given further support in our preliminary attempt at equating the measurement curves.

Figure 7 shows the kind of illusion, whether assimilative or contrast, and the percentage of each kind exhibited by each gp on both tasks. The trend on both tasks is clear: the assimilative illusion decreased with age, and the contrast illusion increased with age. This trend agrees with the developmental trend reported by Uznadze.[21] Wapner and Werner,[22] in a developmental study of the Titchener illusion, an illusion which is superficially similar to the Uznadze visual illusion, reported the same trend with the Titchener illusion. Piaget and Lambercier, as we have already noted (see p. 88) in their developmental study of the Uznadze visual illusion in support of the law of relative centrations, reported, among other findings, that the assimilative and the contrast illusions both decreased with age. This and other contentious issues between the respective studies are returned to after more data has been pulled out of Figure 7.

Concerning the kinesthetic task, note the dominance of assimilation over contrast for the two youngest age gps, and the opposite for the three oldest age gps. Also note: (1) the gradual and continuous increase in contrast of

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[21]Uznadze, The Psychology of Set, p. 84.

[22]Wapner and Werner, Perceptual Development, p. 50.

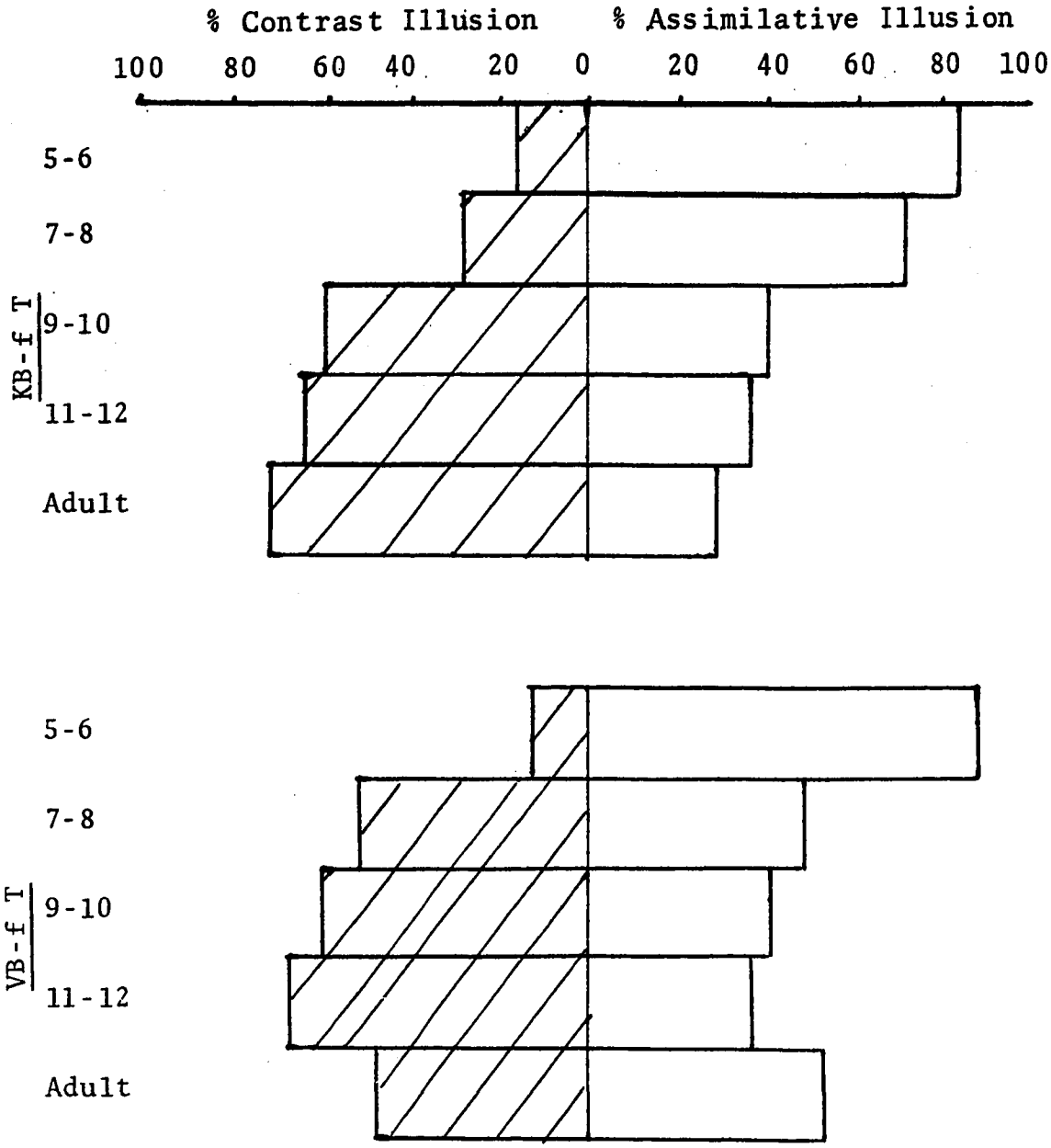

Figure 7. Percentage and Type of Illusion for Each Task by Age Group.

14 percent between the 5-6 gp and 7-8 gp; (2) the sharp and discontinuous increase in contrast of 33 percent between the 7-8 gp and 9-10 gp; and (3) once again, gradual and continuous increases in contrast of 4 percent and 8 percent between the three oldest gps. Concerning the visual task, the sharp and discontinuous increase, in this case of 49 percent, occurred one age gp earlier, otherwise the pattern of findings on both tasks were the same. The assumption in this latter instance was that if we had been able to methodologically process an age gp younger than the 5-6 gp, then we would have found a gradual and continuous increase between these two gps. That the discontinuous increases did not occur at the same age gp on both tasks need not be regarded as unusual (see pp. 64-66). The slight reversal of the trend of 11 percent for the adult gp on the visual task was a result of: (1) the narrow range (R: 6-9) of the VE trials; (2) thirty Ss scored 6, and eight Ss scored between 7 to 9; and (3) the narrow range coupled with the eight scattered scores resulted in an 11 percent reversal. It is reasonable to assume that had the sample been larger this gp would have followed the normal pattern. A finding suggestive of future research was S #54 of the adult gp (see Appendix H(i)), who had a VB-f T profile similar to the mean of the 7-8 gp, both in terms of trials to fixation and extinction, and in dominance of assimilative over contrast illusion.

However, the important outcomes of Figure 7 for our immediate purposes were: (1) the developmental shifts from assimilation to contrast were seen as qualitative changes in the kinds of cognitive structures which characterize the body-schemas of different age gps; (2) in other words, the developmental shifts were seen as being of the same order as those reported by Wapner and Werner (see pp. 64-66); (3) we were given experimental support for our argument that B-f emerges in ontogenesis with definite and predictable changes in modes of cognition; (4) the qualitative changes mitigate against interpreting these results either in terms of: (a) stimulus factors which impose irreversible restraints upon the judgements that can be made about them; and/or (b) in terms of a singular non-cognitive perceptual mechanism that linearly grows in its ability to make successive approximations to the veridical.

The Piaget and Lambercier Study[23]

Piaget's and this researcher's studies differed in the following methodological ways:

	Piaget	Bain
1. Age gps	5-6, 6-7, and adults	5-6, 7-8, 9-10, 11-12, and adults

[23]This study is hereafter referred to as the Piaget study without repeated footnotes. Only those parts of the Piaget study that are of immediate concern are reported here.

	Piaget	Bain
2. N of gps	20, 22 and 40	12, 12, 12, 12, and 38
3. Tasks	Uznadze visual illusion	Uznadze kinesthetic and visual illusions
4. Diameter of Tachisto-scope circles	A. 20 and 28 mm. B. 24 and 24 mm.	A. 10 and 20 mm. B. 14 and 14 mm.
5. Method of fixation	Three conditions in which each S had the number of fixation trials defined for him. The conditions were 3 or 6 or 10 trials to fixation.	Each S defined his individual number of trials to fixation in terms of his performance on the tasks. The pattern of fixation trials was: 1, 2-3, 4-6, 7-10, 11-15, 16-20.
6. Method of extinction	Each S was given 10 extinction trials irrespective of his number of adequate perceptions.	Each S defined his individual number of trials to extinction in terms of his performance on the tasks. Five trials of adequate perception served as the extinction criterion.
7. Statistic	Simple proportion	Analysis of variance for repeated measures on one factor, coupled with, Scheffé a posteriori test of significance.

Apart from the intent of the researchers the methodological differences in themselves had certain consequences. By using only two younger children's gps and an adult gp Piaget could not demonstrate the performances of the intervening age gps. He could only speculate as to the nature of their performances. Piaget probably assumed linearity of development between the age gps. But as we have seen with our own results the linearity had other consequences

which were not readily apparent and could only be found by testing. We also assumed linearity of development, but our age intervals were only one year for the childrens' gps and contiguity of measurement curves for the last childrens' gp and the adult gp. Piaget omitted the entire concrete operations age range. Because of the larger Ns Piaget's childrens' gps results could be more representative. However we met the conditions for the use of the particular statistics. We also statistically controlled for interaction effects; Piaget did not. By using only the Uznadze visual illusion Piaget left himself in the position of comparing his results to those obtained in a previous study on the Delboeuf illusion, which is a valid comparison, but only up to a point. The circles of the Delboeuf are presented simultaneously and the circles of the Uznadze are presented successively. There is also evidence which suggests that we may expect different ontogenetic trends for simultaneous versus successively presented illusions.[24] It seemed more methodologically sound to this researcher to compare analogous illusions. It was not expected that the differences in circle diameter would appreciably alter the measurement curves. Both methods of fixation and extinction have their merits and drawbacks. By using prearranged or programmed numbers of trials to fixation and extinction

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[24] M. Sagara and T. Oyama (U. Tokyo), Experimental studies of figural after effects, Psychol. Bull., 1957, 54:327-338.

Piaget knew exactly where his operating limits were, and could observe the different patterns within comparable limits. By allowing the S to define his own number of trials in terms of his performance we knew where the operating limits were only after the S had completed the task. With Piaget's method there was minimal chance of E error. With our own method the chance of E error was increased because the E had to remain alert to the S's verbalizations. Programming the number of fixation trials was also advantageous to Piaget in that he did not have to introduce a certain pattern of fixation test trials, as we did, and again run the risk of introducing E error, as we did. It also allowed Piaget to concentrate on the extinction trials. Piaget astutely noted in this regard that "extinction trials, seen as measures of the amount of time required to restore equilibrium, are potent indicators of cognitive dynamics." However programming is not advantageous for observing at what trial a S fixated and extinguished in accordance with his self defined cognitive dynamics. This type of observation is, as we noted with our study, sine qua non for a developmental study. The differences between age gps on both the fixation and the extinction sides of the tasks in terms of their respective age gp performances are valuable data for the understanding of these cognitive dynamics. They are equally as valuable as are the differences in assimilative and contrast illusion

performances. By concentrating on the extinction trials and the illusion performances, Piaget ignored a valuable item of data. As spectacular and informative as are the extinction and illusion performances, they are only part of the total picture. Moreover what programming means in practical terms is that the results cannot be readily studied in relation to other variables, such as participation.

However, there is more to these methodological differences than which evil does one prefer: greater control, less chance of E error, less data, and less scope with Piaget's study, or, less control, more change of E error, more data, and more scope, as with this study. There is also the question of interpreting the two sets of data in terms of the law of relative centrations.

One implication of this law is that there is an increasing veridicality of perception with age resulting from the increasing intervention of regulatory mechanisms such as decentrations. This law would predict less trials to fixation with an increase in age. Less trials would indicate an increased intervention of decentrations. We found more trials to fixation with an increase in age (see Table IV). The mean differences were not significant, but the face value trend was toward an increase with age, particularly on the visual task, the task which Piaget used. Were Piaget to argue that the increased veridicality served

to diminish the susceptibility of the adult S to the demands of the illusion and therefore he took more trials to fixation, then there would be little disagreement. But, if he were to argue his more usual case, then there would be reason to suspect the validity of the law, at least with respect to these two fixation measures.

It is interesting to note that Piaget did not cite his own fixation results in support of the law. One reason was his experimental design. If the identical number of programmed trials are given to all age gps there are no differences to report.

This law would also predict less trials to extinction with an increase in age. The prediction was upheld by both sets of data.

The above predictions stated in the formal language of the law of relative centrations (see pp. 85-86) would read:

(1) (a) Let N represent the aggregate of possible encounterings. The aggregate in these examples being the score of the youngest age gp.

(b) Let n represent the mean number of actual encounterings.

(c) Let (+) and (-) represent an increase and decrease in n relative to N.

(d) Let (o) represent no change in n relative to N.

(e) Let (*) designate those relationships whose direction is opposite that predicted.

(2) The equations for Piaget's study by age gp.

(a) VE (Non), (N-n), (N-n)

(b) Of two possible contradictions there were zero.

(3) The equations for the present study by age gp.

(a) KF (Non), (N+n)*, (N-n), (N+n)*, (N+n)*

(b) KE (Non), (N-n), (N-n), (N-n), (N-n)

(c) VF (Non), (N+n)*, (N+n)*, (N+n)*, (N+n)*

(d) VE (Non), (N-n), (N-n), (N-n), (N-n)

(e) Of sixteen possible contradictions there were seven.

(4) Conclusions.

(a) The errors[25] of fixation increased with age. There was one exception to the trend.

(b) The errors of extinction decreased with age.

(c) The shape of the error curves were constant with age. The fixation curves increased and the extinction curves decreased with age.

(d) The law of relative centrations does not hold in all instances.

There were two further issues between the studies. Firstly, Piaget reported a "dominance of assimilative illusion for the two childrens' gps, and a dominance of contrast illusion for the adult gp." This finding was supported by our study. Piaget also reported that "the extent of the illusion decreased over all portions of the function." In our terms, the assimilative and contrast

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[25] Piaget's term "error" is being cited here instead of the term "trial".

illusions both decreased with age. Piaget was again supported by our findings. But the statement needs some clarification. The Uznadze illusions gave two types of measures: fixation and extinction, and a trial is the unit of measurement. The extinction trials have a phasic nature, that is, the materials can be perceived in an assimilative or a contrast or an adequate manner (see pp. 110-111). The assimilative or contrast perceptions are the kinds of illusions that manifest during the extinction trials. Piaget's statement was correct in the sense that since the gross number of extinction trials decreased with age, therefore, the gross number of illusions must also have decreased with age. But it was not correct in the sense of what percent of the gross number of extinction trials were assimilative relative to contrast for any given age gp. To give a concrete example of the latter, note in Figure 7 that the 5-6 gp, on the KE trials, had 81 percent assimilation and 19 percent contrast. Note the gross number of KE trials for the 5-6 gp found in Appendix H(i). The gross number is calculated by removing five trials from each S's individual histogram, five trials being the criterion trials of adequate perception, and by doing a log count on the remainder. The gross number in this case was 107 trials, of which eighty-six were assimilative and twenty-one were contrast. Therefore, the percentage of assimilation to contrast was 81 percent to 19 percent for the 5-6 gp. This

type of analysis was repeated for each age gp on both extinction measures, and was demonstrated in Figure 7. It was also concluded, contrary to Piaget but in agreement with Uznadze, that the contrast illusion increased with age.

Secondly, Piaget reported that "the contrast illusion increased at a faster rate for the adults than for the children as the number of presentations of the inducing stimulus increased." In our terms, as the number of programmed fixation trials increased, the adults showed more contrast illusions than did the children. This finding was supported by our study. But once again the statement needs clarification. The most telling way to explain the issues here is to replicate Piaget's study, which is what we did do, with the following methodological differences:

	Piaget	Bain
1. Age gps	as per above	5-6, and adults
2. N of gps	as per above	20, and 20
3. Task	as per above	Uznadze kinesthetic illusion
4. Method of fixation	as per above	3, 6, 10, and 15 programmed trials
5. Method of extinction	as per above	as per above
6. Statistic	as per above	as per above

The methodological changes had certain consequences. The omission of the 6-7 gp had no effect on the immediate issues. The larger Ns were necessary because Ss were used only

in one condition, i.e., Ss were randomly assigned to the condition of three or six or ten or fifteen programmed fixation trials and used only in one of these conditions. It was more suitable to use the kinesthetic rather than the visual task because: (1) the kinesthetic task was found to be more reliable with 5-6 year olds; (2) the greater reliability was felt to be a major consideration in regard to these controversial issues; and (3) Uznadze[26] has already presented evidence in regard to these issues with respect to the visual illusion, but has not presented similar evidence with respect to the kinesthetic illusion. The inclusion of one more programmed condition allowed for a clearer picture. The individually defined extinction trials placed a less arbitrary limitation on the S's performances.

Means, analysis of variance, and comparison of means were determined for the KE measures of the programmed KF trials for the N of both gps. These results are found in Tables XVI, XVII, and XVIII respectively. The distribution of the raw data is found in Appendix I. The illusion performances are presented in Figure 8. For ease of comparison Figure 8 also includes a carry over of the appropriate part of Figure 7.

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[26]Uznadze, The Psychology of Set, pp. 76-79.

TABLE XVI

EXTINCTION MEANS FOR PROGRAMMED KINESTHETIC FIXATION TRIALS OF 5-6 AND ADULT GROUPS

		Programmed Trials			
		3	6	10	15
Kinesthetic Extinction	5-6 gp	14.40	17.60	17.20	17.80
	Adult gp	6.00	7.80	12.00	11.80

TABLE XVII

ANALYSIS OF VARIANCE FOR PROGRAMMED TRIALS OF 5-6 AND ADULT GROUPS

Source	SS	DF	MS	F
Between 5-6 Group	37.75	3	12.58	4.19*
Within 5-6 Group	48.00	16	3.00	
Between Adult Group	133.20	3	44.40	45.54**
Within Adult Group	15.60	16	0.98	

F .95 (3,16) = 3.24

TABLE XVIII

SCHEFFÉ MULTIPLE COMPARISONS OF KINESTHETIC EXTINCTION MEANS FOR PROGRAMMED TRIALS OF 5-6 AND ADULT GROUPS

	5-6 Group			Trials	Adult Group		
Trials	6	10	15		6	10	15
3	**	**	**	3	NS	**	**
6		NS	NS	6		**	**
10			NS	10			NS
15				15			

F .95, 3(3,16) = 9.72

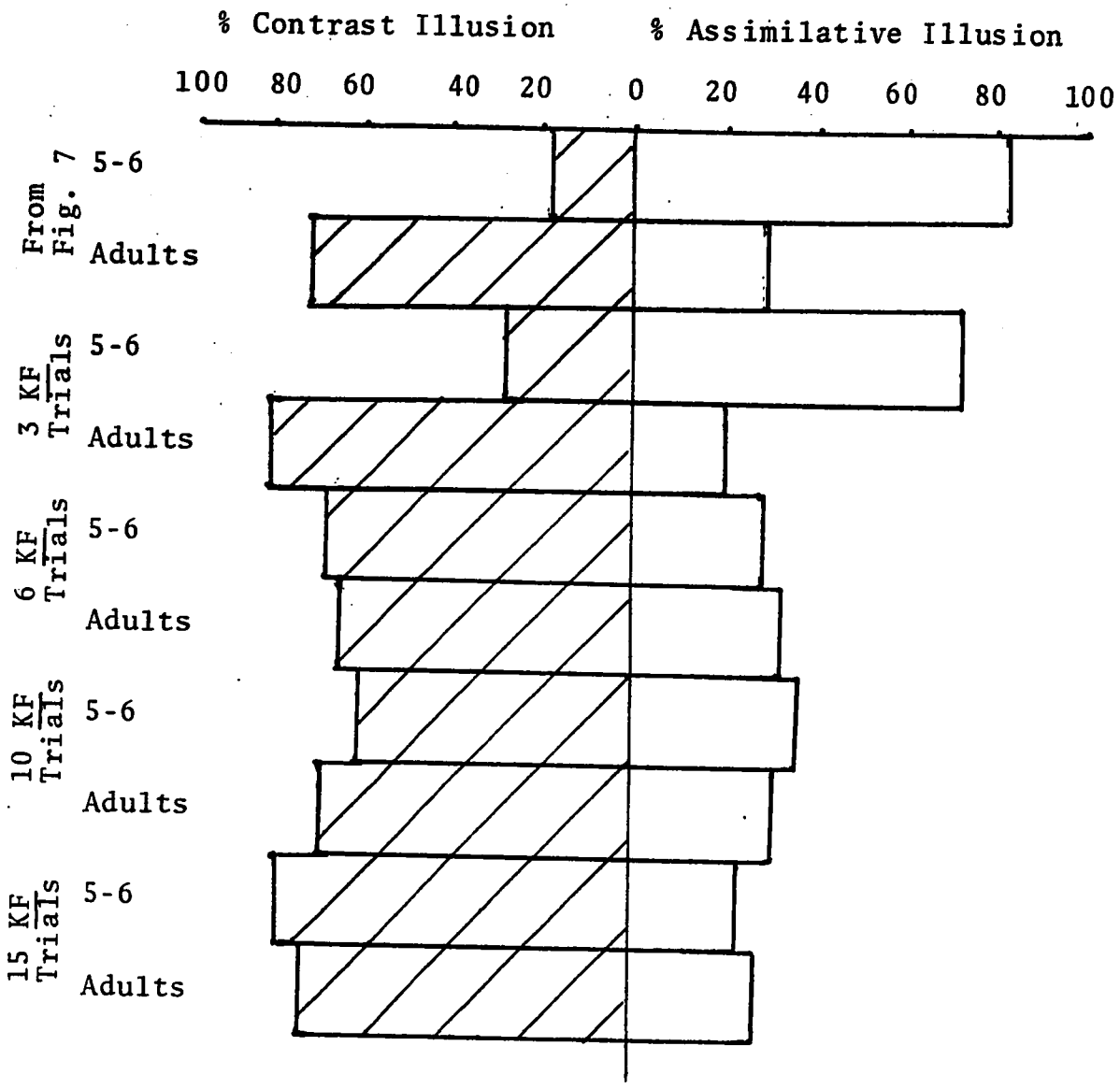

Figure 8. Percentage and Type of Illusion per Programmed Trial.

Note: The two histograms at the top of the Figure are carried over from Figure 7.

The first issue here concerned the thresholds of performance. Note in Table XVI, and supported by Table XVIII, that there were no differences within the 5-6 gp performances on programmed trials six, ten, and fifteen, and similarly within the adult gp on trials ten, and fifteen. In other words, the upper threshold limit for the 5-6 gp was between three to six (i.e., 4.5) fixation trials, and for the adult gp it was between six to ten (i.e., 8.00) fixation trials. The lower thresholds, which are in fact the gp's means when the experimental design allows the Ss to define their own levels of fixation performances, are shown in Table IV. Comparison of Tables IV and XVI show that the threshold range for the Uznadze kinesthetic illusion were: for the 5-6 gp, R:1.83 to 4.5, and for the adult gp, R:2.55 to 8.00. Below the respective ranges the Ss were not susceptible to the demands of the illusion. Above the respective ranges the homeostatic properties of permanent satiation were introduced. The latter is a valid area of inquiry. The cognitive dynamics of that area need not concern us here, except to point out that by introducing these properties Piaget obtained the results which account in part for his statement.

The issue here can also be explained by looking at Figure 8. The two histograms at the top side of the figure are carried over from Figure 7. Note the percentages of assimilation to contrast for the adult gp under the

individually defined conditions, then under the programmed conditions. There was little change. The contrast dominated under all conditions. But, note the changes for the 5-6 gp. When the fixation trials increased from individually defined (i.e., 1.83) to three, the contrast figure increased by 10 percent. When they increased to six, the contrast figure increased by 38 percent; and so on for ten and fifteen programmed trials. Part of the clarification is: (1) the child's lower and upper thresholds are lower than the adult's respective thresholds; (2) when the child's performance is individually defined he shows a dominance of assimilation over contrast; (3) when the child's upper threshold is passed, that is, when the fixation trials are increased beyond his upper threshold he becomes cognitively saturated; (4) the saturation manifests a different kind of cognitive dynamic and the child now shows a dominance of contrast over assimilation; and (5) (a) because the child's upper threshold is beyond the adult's lower threshold; and (b) because the adult shows a dominance of contrast from his lower threshold; therefore, (c) the contrast increased more rapidly for the adult.

In other words, Piaget demonstrated the effects of systematically varying the stimulus dimensions of the Uznadze illusion. As such, he has offered replicated and supportive evidence for Uznadze's own findings in this regard. As valuable as this type of evidence is, it cannot

be parsimoniously seen as supporting the law of relative centrations.

The other part of this clarification concerns our findings which support Piaget's statement, or, stated more accurately, which support Piaget's statement when it is taken at face value. Using our methodology, the adult begins to show the contrast illusion at a numerically lower trial than does the child. Therefore, his contrast increases at a faster rate than does the child's. But this is not because of the law of relative centrations, rather it is simply because of the stimulus dimensions of the tasks coupled with the different kinds of cognitive dynamics that manifest at different stages of development.

It does not necessarily follow from all this that Piaget's findings in the Delboeuf study are also in need of clarification. But, Piaget did use the same rationale and a similar methodology with the Delboeuf as he did with the Uznadze. He also cited both sets of data in support of the law of relative centrations.

As this writer sees it, Piaget's law would have to be appreciably altered to do justice to our or even to his own data. For example, Piaget could not interpret our data by saying there was an increase of decentrations with age. To say that the adult had an increased number of trials to fixation because of his increased number of decentrations would not make sense. Piaget could only state rightly that

the adult had a decreased number of trials to extinction because of his increased decentrations. A similar interpretation problem arises if Piaget were to attempt to apply his law to Wapner's and Werner's body tilt findings (see pp. 64-67). He could not say that the adult over-compensated because of increased decentrations. Again, he could rightly state only that the child undercompensated because he could not decenter. The point is that Piaget's law is not universal. There are perceptual situations to which it cannot do justice. Piaget's law should be seen as having predictive validity for certain situations and not for others.

It seems more reasonable to this writer to begin with the world as it is perceived, then work backwards to the laws of cognitive dynamics rather than to start with a single abstraction of that world, such as the law of relative centrations, and attempt to reconstruct the world in the image of that law.

What tends to happen when one begins with a law, which one must then go out and prove, is that those situations that support the law are emphasized and those that do not or are equivocal in their support, are minimized. Data which could improve the scope of the law as well as possibly refute it tend to be overlooked, not because of chicanery, but because the law tends to dictate the experimental designs that can best support its tenets.

The Imaginal KB-f T Study

The number and percentage of Ss in each gp that imaginally mobilized the body such that they exhibited the kinesthetic illusion, are shown in Table XIX. An elementary statistic was used in Table XIX because of the nature of the data. There were no fixation or extinction measures with this type of an experimental design (see pp. 116-117).

TABLE XIX

NUMBER AND PERCENTAGE OF SUBJECTS EXHIBITING IMAGINAL KINESTHETIC FIXATION

Group		5-6	7-8	9-10	11-12	Adults
Imaginal Fixation	No.	8	5	0	0	7
	%	66.66	41.66	0	0	18.42

A S either exhibited the illusion or he did not, and he was simply scored "1" or "0". For example, eight Ss or 66.66 percent of the 5-6 gp exhibited the illusion. The distribution of the raw data in the form of the numerical designations of the Ss who performed the Imaginal KB-f T are found in Appendix H(ii).

During our explorations in this study we found that reliability measures could not be taken. They would have been artificial since there were design factors which could not be adequately controlled. These were: (1) the procedural instructions varied between and within gps; and

(2) this task was subject to practice effects. These factors mitigated against seeing the results of this minor study as being very potent in themselves. Nevertheless, when placed in the overall context they were highly suggestive.

Note the semi-U shape of the developmental curve. It descends between 5-6 gp and 7-8 gp, is of zero value for the two middle gps, and rises again with the adult gp. This curve could be seen as evidence of Werner's principle of orthogenesis. This principle would suggest that:

(1) The younger child performed the task because his primitive action systems were fused in a more gobal organization. His imaginal activities were functional at this stage, not because of his ability to use his imagination as a discrete action system, but because it was no more or no less subordinate to his other action systems.

(2) The drop in performance for the middle gps and for the majority of the adults came about because, as the action systems emerge as discrete entities they arrange themselves in a hierarchy of functional efficacy, and in these cases, the imaginal action systems were more subordinate in the hierarchy.

(3) The adult who performed the task did so because he could use his imagination as a discretely organized action system.

That these results could be seen as evidence of the primitive child and the sophisticated adult performing in a like manner but from differentially organized cognitive dynamics was also suggested by certain idiographic evidence. Individual comparisons of each of the thirteen children who performed the Imaginal task with their respective scores on

the K & VB-f Ts (see Appendices H(ii) and H(i)) shows that they performed these latter tasks more poorly than the individuals of their respective gps who did not perform the Imaginal task. Nomothetically, this finding is not very potent since a "1" or "0" measure was used on the Imaginal task and thirteen out of twenty-four is little better than chance. But, the Imaginal and the K & VB-f Ts measures were obtained independently of each other. Therefore these measures can be compared one to the other. It is likely that the thirteen children who did not as readily distantiate the "in here" from the "out there" on the K & VB-f Ts, and who also happened to be the same children who did perform the Imaginal task, did so in both instances because of the same kind of cognitive dynamics, viz., because their action systems were more closely fused, they were simultaneously less able to perceive their subjectivity and objectivity in relation to the K & VB-f Ts, and more able to perform the Imaginal task. The K & VB-f Ts both involve the ability to perceive one's subjectivity and objectivity in relation to experimentally isolated sensory modalities. Because his experiential poles, in relation to these two modalities, are more-or-less fused, it is difficult for the child to distantiate from the same. By the same token, this child can imaginally prepare his body to expect a "very heavy ball and a very light ball" not because he can experience his body as can the adult, but because his imaginal action

system is part of his fused global cognitive dynamic.

Individual comparisons of the seven adults who performed the Imaginal task shows that without exception they also performed the K & VB-f Ts better than the majority of their gp. Again, nomothetically it could be justly claimed that seven out of thirty-eight is what one would expect to find in the upper quartile of a normal distribution of "1" and "0" scores. But, in addition to the independence of the measures, the fact remains that it was the same seven Ss who most readily distantiated the "in here" from the "out there" in relation to the K & VB-f Ts who also performed the Imaginal task.

Some observations of the behaviour of the Ss are pertinent here. The child who performed the Imaginal task usually did so in a diffuse way. He pretended that he was lifting the heavy and the light ball by literally putting his whole body into the task. He was spontaneous about this task in the sense that he seemed to have little consciousness of his body-as-subject in relation to his body-as-object. His response was more of the order of whole body and imagined external objects integrated into a global activity. Some of the children who did not perform this task seemed to treat it as a problem which could be solved in some concrete way. They would search for some external or hidden clue or trick which would help them solve the problem. For example, they would question the E for more information or ask if what they

were doing at the moment (e.g., pressing one hand into the other, holding one hand higher than the other, etc.) would help in performing the task. With other children, the E could not communicate the procedural instructions satisfactorily and rather than lose the S altogether he was scored "0" on this task.

Some of the adults who did not perform this task seemed to be using the same kind of concrete problem solving approach as did the children who did not perform this task. Many were too embarrassed to make other than a partial attempt at performing this task. Some passed comments such as "what kind of nonsense is this" and "you're kidding". Others were surprised to find that they could not perform this task. The adult who performed this task was usually as spontaneous as was the child. But there is little doubt in this writer's mind that the adult spontaneity was more child-like as opposed to child-ish. The adult was spontaneous about this task in the sense that he seemed to be more conscious of his bodily poles of being. He seemed to prepare himself to perform this task in much the same way as an actor prepares for a stage role,[27] that is, he would address himself to himself (body-as-subject to body-as-object) by engaging in a dialogue with himself. Moreover,

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[27] Cf., Maslow, Toward a Psychology of Being; Natadze, op. cit.; Stanislavski, op. cit.; and K. Fisher (Nil), Stanislavsky and psychotherapy, J. Humanistic Psychol., 1964, 4:130-137, for descriptions and analyses of the psychodynamics of this preparation process.

unlike the child's more diffuse response, the adult's response was the studied response of the sophisticated adult. When these adults were questioned afterwards, they generally agreed that the Imagined task was just as real as were the ordinary KB-f Ts. One adult S likened the balls that were placed in his hands following his imaginal preparation to a hundred pound weight and a feather. This S (#82) had a particularly rich and vivid cognitive life as evidenced by his individual profile.

This writer recognizes that this latter type of evidence is not admissable to all researchers. However, the "more solid" evidence is that these same seven adults also obtained outstanding scores on the tests of participation.

It was concluded that: (1) the results obtained in this exploratory study were more suggestive than conclusive; (2) the results complimented the K & VB-f T results but they were subject to elementary design criticisms; (3) the results suggested that the B-f construct could be used in a less precise area of inquiry to discover new problems and to offer tentative answers to old problems; and (4) the Imaginal KB-f T was a potentially potent tool for understanding cognitive dynamics.

In sum: (1) a lawful and regular developmental continuum of B-f in the kinesthetic and the visual modalities was found; (2) the nature and the interrelationships of the

measurement curves were described; (3) the law of relative centrations could not adequately explain the data; (4) contentious issues between Piaget's study and our study were analyzed; and (5) the feasibility of using the B-f construct in an Imaginal B-f T was explored.

PART II

Reliability

The reliability scores for the Exp Lin, Exp Fac, Por Sen, and Int Sit tests, the statistic used to ascertain each score, and the type of reliability measure by age gp are shown in Table XX. The conditions for use of each statistic were met.[28] The four tests of participation produced acceptably reliability scores for all age gps.

The interrater reliability scores on Exp Lin were derived from the Js' total scores. The interrater consistency scores on Exp Lin were derived from the J's scores on individual items. The interrater reliability scores were lower than desirable. They also ranged from r .14 or .20 below those reported by Walton.[29] However these low scores did not overly detract from the overall reliability of the Exp Lin test. Because: (1) the

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[28] Downie and Heath, op. cit., pp. 215-234; and, T. Maguire and C. Hazlett (U. Alberta), Reliability for the researcher, Alta. J. Edu. Res., 1969, 2:117-126.

[29] Walton, op. cit., pp. 55-58.

TABLE XX

RELIABILITY SCORES FOR EXPRESSIVE LINES, EXPRESSIVE FACES, PORTRAIT SENSITIVITY, AND INTERVIEW SITUATION BY GROUP

Group	EXPRESSIVE LINES				EXPRESSIVE FACES		
	Inter Rater Consistency (a)	Inter Rater Reliability (b)	Coefficient of Equivalence (c) Exp Fac	Por Sen	Coefficient of Internal Consistency (d)	Coefficient of Equivalence (c) Exp Lin	Por Sen
5-6	.95	.44	.96	x	.91	.96	x
7-8	.96	.55	.82	.83	.88	.82	.95
9-10	.97	.42	.69	.61	.94	.69	.51
11-12	.96	.54	.77	.76	.96	.77	.93
Adults	.73	.38	.89	.81	.93	.89	.84

	PORTRAIT SENSITIVITY			INTERVIEW SITUATION	
	Coefficient of Internal Consistency (d)	Coefficient of Equivalence (c) Exp Lin	Exp Fac	Inter Rater Consistency (a)	Inter Rater Reliability (b)
5-6	x	x	x	.96	.76
7-8	.63	.83	.95	.91	.84
9-10	.74	.61	.51	.94	.69
11-12	.81	.76	.93	.99	.75
Adults	.69	.81	.84	.82	.68

a -- Pearson (r)
b -- Pearson (r)
c -- Spearman rho (ρ)
d -- Spearman-Brown (r_{TT})
x -- Did not apply

interrater consistency scores were high; and (2) concurrent validity of a high order accrued when coefficients of equivalence were derived from the Exp Fac and Por Sen tests. The assumption in this latter instance was that the Exp Lin, Exp Fac, and Por Sen tests were parallel forms of each other, an assumption that was statistically supported.

Coefficients of internal consistency, with the Spearman-Brown correction for test length, revealed that the Por Sen was less internally consistent relative to the Exp Fac. The mechanics of the Exp Fac force a S to rearrange his matchings when he is down to his last loose photograph and it obviously does not match the only remaining fixed photograph. During the process of rearranging, the S usually makes a few corrections. Hence the Exp Fac has a built in correction factor. The Por Sen does not have this correction factor. The result of these technical differences is that the Por Sen had less internal consistency than the Exp Fac. But the derived consistency scores were nonetheless acceptable for both tests.

The rating scores of the Int Sit were generally higher than the rating scores of the Exp Lin. It was felt that this discrepancy was not so much due to the greater reliability of the Int Sit Scale (and its Js) over the Exp Lin Scale (and its Js) as it was due to the nature of the respective data. In the Int Sit the Js could observe the total communication process: body language, gestures,

verbalizations, etc., and as such, the Js could evaluate a S's performance more readily. With the Exp Lin, all the Js had to go on were the Ss' verbalizations. With only one part of the total process to observe, the probability of disagreement between the Js increased.

Individual item analyses of the nine Exp Lin, twenty pairs of Exp Fac, and the twenty-four portraits of the Por Sen were not derived. These analyses would have been excessive in light of: (1) what is already known about the items from previous researchers (see pp. 109-114); (2) the analyses already presented and the further analyses presented below; and (3) the individual scores of each S on each item of each test that are found in the Appendix H. The latter can be seen as an item analysis in raw data form.

It was concluded that this battery of four tests was statistically reliable, internally consistent, and had some concurrent validity. Ultimate validity is as always a moot point. For the operational purposes of this thesis, this battery was defined as, and considered to be, a sound measure of participation.

Development of Participation

Exp Lin. The means, standard deviations and variances, an analysis of variance, and comparisons of sample means were determined for each age gp on the Exp Lin test. These results are found in Tables XXI, XXII, and XXIII respectively. Individual Ss' results are found in Appendix

TABLE XXI

SAMPLE MEANS, STANDARD DEVIATIONS, AND VARIANCES FOR EXPRESSIVE LINES TEST

	Groups				
	5-6	7-8	9-10	11-12	Adults
Mean	3.70	3.30	3.50	3.82	3.81
S.D.	1.23	1.19	1.14	1.70	1.55
Var.	1.52	1.41	1.31	1.37	2.40

TABLE XXII

ANALYSIS OF VARIANCE FOR ALL GROUPS ON EXPRESSIVE LINES TEST

Source	SS	DF	MS	F
Between Groups	3.28	4	.82	.42
Within Groups	158.05	81	1.95	

F .95 (4,81) = 2.48

TABLE XXIII

SCHEFFÉ MULTIPLE COMPARISONS FOR SAMPLE MEANS ON EXPRESSIVE LINES TEST

Group	7-8	9-10	11-12	Adults
5-6	NS	NS	NS	NS
7-8		NS	NS	NS
9-10			NS	NS
11-12				NS
Adult				

F .95 4(4.81) = 9.92

H(iii).

The Exp Lin test is scored in terms of a seven point scale. No significant differences between gps were found. This finding was partially a consequence of the nature of the statistical treatments that had to be used to present a nomothetic picture of the data. See Tables XXI, XXIV, and XXV, and Appendix H(iii). Note just Bain's data for the moment: (1) each S's score on each item, found in Appendix H(iii), is a composite score representing the mean of two Js' ratings; (2) the sum of these item scores were themselves summed and divided by the item N to obtain the average gross score presented in Table XXIV; (3) the sum of these item scores were divided by the gp N to obtain the average item score presented in Table XXV; finally (4) these average scores were divided by their respective Ns to obtain the grand means presented in Table XXI. In other words, the statistical treatments resulted in four successive regressions toward the center of the data pool, and in part, accounted for the picture presented in Table XXI.

Other reasons for this picture were: (1) the conservative statistics used (to control for interaction effects and to avoid type one errors); (2) the generally cautious judgements made by the Js as reflected in Table XX, and/or in Appendix H(iii); and (3) a reason which is also an important finding, namely, that the measurement curves of each age gp were spread over the entire range of scores.

TABLE XXIV

COMPARISON OF WALTON'S DEVELOPMENTAL NORMS WITH BAIN'S SCORES

	Gross Scores by Group				
	5-6	7-8	9-10	11-12	Adult
Walton	36.00	40.51	46.59	46.02	52.68
Bain	33.29	29.64	31.51	34.39	34.30

Note: Statistical transformations were necessary to equate Walton's and Bain's scores. Walton's scores were taken from his Table VII. That Table shows gross scores. For example, out of a possible score of 63 (for 9 items by 7 points of the scoring scale) Walton's 5-6 gp scored an average of 36. Bain's gross scores are read directly off his Appendix H(iii). Walton reported each age gp from 6 years to adults. Bain let Walton's upper age be the equivalent of his respective gps. For example, Bain let Walton's 6-year-olds be the equivalent of his 5-6 gp. Walton included 14 items in his Exp Lin test. Bain used only the first 9 items. Bain assumed equal distribution of scores and deducted 5/14 from each of Walton's stated scores. Since the range of mean scores reported by Walton in his Table X were equatable with Bain's item means it was not expected that the various transformations had appreciably altered the overall picture.

TABLE XXV

COMPARISON OF WALTON'S NORMED ITEM MEANS WITH BAIN'S ITEM MEANS

	Item Value								
Item	1	2	3	4	5	6	7	8	9
Group									
Walton	4.40	4.76	4.68	5.51	4.81	5.28	4.60	4.50	3.61
Bain 5-6	4.25	3.21	4.46	2.97	3.67	2.92	3.75	4.13	3.92
7-8	3.83	3.25	4.17	2.54	3.58	3.25	2.96	3.04	3.04
9-10	3.42	3.71	2.67	3.21	3.75	2.50	3.63	4.58	4.04
11-12	3.38	4.71	2.92	3.00	4.42	3.42	5.25	3.46	3.83
Adult	4.13	3.50	4.20	3.35	3.22	4.01	3.61	4.29	3.99

Note: Walton's scores were taken from his Table X.
Bain's scores are read directly off Appendix H(iii).

The first two reasons need no further explanation. Let us look at the third. On the one hand, comparison of Walton's[30] and Bain's gross scores in Table XXIV shows that the respective measurement curves generally parallelled each other. The numerical differences, and the 5-6 gp peak were assumed to be due to the interplay of reasons mentioned above. On the other hand, comparison of the measurement curves of each age gp on any individual item in Table XXV shows that there were no consistent patterns of any type with reference to age gps. On some items younger children's gps scored higher than older children's gps. On other items certain children's gps scored higher than the adults. This pattern, of course, merely reflected the scores of individual Ss within the different age gps. (A rapid scanning of the Ss' summed item scores, read off the Total Item Score column of Appendix H(iii), will show that some children had adult scores, and some adults had children's scores.) The overall trend of the Ss' summed item scores was toward an increase with age, but the range of scores within each gp cancelled each other out. Considering only the youngest and the oldest gps for example, the ranges were: 5-6 gp, R:2.11 (S #4) to 6.33 (S #3); adult gp, R:1.50 (S #74) to 6.39 (Ss # 66, 82). This latter finding was important for studying individual differences. But, it also contributed to the

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[30]Walton, op. cit., p. 58.

statistically accurate but misleading picture presented in Table XXI.

These results as presented here could not be cited as evidence of an increase in participation with age. However, the statistical problems notwithstanding the overall trends did agree with Walton's findings, and, to get ahead of ourselves for a moment, we will see in Part III that the individual scores did discriminate the good from the poor performers.

Exp Fac. The means, standard deviations and variances, an analysis of variance, and comparisons of sample means were determined for each age gp on the Exp Fac test. These results are found in Tables XXVI, XXVII, and XXVIII respectively. Individual Ss' results are found in Appendix H(iv).

The Exp Fac test is scored in terms of errors out of twenty. Table XXVI shows a regular decrease in the number of errors with age. Table XXVIII shows that there were no significant differences in performance between 5-6 gp:7-8 gp, and 7-8 gp:9-10 gp, but that there were significant differences of $p < .05$ between the three oldest gps. Had our level of acceptance been set at .09 the difference between 7-8 gp:9-10 gp would have been on the borderline of acceptance. Most of the large F of Table XXVII was due to the five alternate gp comparisons that were significant at $p < .01$. This large F, coupled with the small

TABLE XXVI

SAMPLE MEANS, STANDARD DEVIATIONS, AND VARIANCES FOR EXPRESSIVE FACES TEST

	Groups				
	5-6	7-8	9-10	11-12	Adults
Means	10.58	10.08	8.42	5.75	3.58
S.D.	2.43	2.02	1.93	1.83	2.12
Var.	5.91	4.08	3.74	3.35	4.51

TABLE XXVII

ANALYSIS OF VARIANCE FOR ALL GROUPS ON EXPRESSIVE FACES TEST

Source	SS	DF	MS	F
Between Groups	728.95	4	182.24	39.23**
Within Groups	376.26	81	4.65	

F .95 (4,81) = 2.48

TABLE XXVIII

SCHEFFÉ MULTIPLE COMPARISONS FOR SAMPLE MEANS ON EXPRESSIVE FACES TEST

Group	7-8	9-10	11-12	Adults
5-6	NS	NS	**	**
7-8		NS	**	**
9-10			*	**
11-12				*
Adult				

F .95, 4(4,81) = 9.92

and regular variances of Table XXVI, suggested that our findings were sound.

The adult norms on the Exp Fac test reported by Fields[31] were: Mean, 5.50, S.D., 3.16. There was a significant difference of $p < .06$ between our adult gp performance and Fields' norms. In error terms: (1) our adult gp made 1.92 fewer errors than Fields' population; and (2) our 11-12 gp made 0.25 more errors than Fields' population. Fields' norms fell between our two oldest gps' performances, and our 11-12 gp more closely approximated Fields' population. These differences between Fields' population and our sample were assumed to be due to the nature of our sample.

These results were cited as evidence of an increase in participation with age.

Por Sen. The means, standard deviations and variances, an analysis of variance, and comparisons of sample means were determined for each age gp on the Por Sen test. These results are found in Tables XXIX, XXX, and XXXI. Individual Ss' results are found in Appendix H(v).

The Por Sen test is scored in terms of number correct out of twenty-four. Table XXIX shows a regular increase in number correct with age. Table XXXI shows that there were no significant differences in performance between 7-8 gp:9-10 gp, and 9-10 gp:11-12 gp, but that there was a

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[31] Fields, op. cit., p. 69. Fields' data were taken from his Table III.

TABLE XXIX

SAMPLE MEANS, STANDARD DEVIATIONS, AND VARIANCES FOR PORTRAIT SENSITIVITY TEST

	Groups				
	5-6	7-8	9-10	11-12	Adult
Means	x	8.33	9.83	11.67	14.59
S.D.		2.89	1.95	2.39	3.61
Var.		4.07	3.81	5.72	13.03

x -- Did not apply

TABLE XXX

ANALYSIS OF VARIANCE FOR FOUR GROUPS ON PORTRAIT SENSITIVITY TEST

Source	SS	DF	MS	F
Between Groups	463.95	3	154.65	16.80**
Within Groups	644.26	70	9.20	

F .95 (3,70) = 2.74

TABLE XXXI

SCHEFFÉ MULTIPLE COMPARISONS FOR SAMPLE MEANS ON PORTRAIT SENSITIVITY TEST

Group	9-10	11-12	Adults
7-8	NS	NS	**
9-10		NS	**
11-12			*
Adults			

F .95 3(3,70) = 8.22

significant difference of $p < .05$ between the two oldest gps. Had our level of acceptance been set at .07 the difference between 9-10 gp:11-12 gp would have been on the borderline of acceptance. Most of the large F of Table XXX was due to the two alternate gp comparisons that were significant at $p < .01$. The large adult gp variance of Table XXIX was partially due to the adult's random performance on the more ambiguous portraits. Some adults seemed more conscious of the fact that certain portraits could not readily be matched with the category of emotion cards. Unfortunately these same adults were not always the same adults who obtained the highest scores. This large variance notwithstanding the overall findings were sound.

The adult norms on Scroggs'[32] version of the Por Sen test were: Mean, 12.83, S.D., 2.28. There was a significant difference of $p < .09$ between our adult gp's performance and Scroggs' norms. In terms of number correct: (1) our adult gp made 1.76 more correct matchings than Scroggs' population; and (2) our 11-12 gp made 1.16 less correct matchings than Scroggs' population. Scroggs' norms fell between our two oldest gps' performances, and our 11-12 gp more closely approximated Scroggs' population. Once again the differences were assumed to be due to sampling.

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[32]Scroggs, op. cit., p. 132. Scroggs' data were taken from his Table III.

The 5-6 gp simply classified the portraits into "happy pictures" and "sad pictures". See Appendix H(v). Excluding portrait #5, the remaining three "angry", five "contempt", and seven "fear" portraits, times ten Ss (2 Ss, #s 3 and 9, did not complete this test; one S, #6, did not place portrait #21) equals a data pool of 149 items. These "anger", "contempt", and "fear" portraits were divided into "happy pictures" twenty-three times, and into "sad pictures" 126 times. The same calculating procedure leaves a data pool of fifty "love" items. The "love" portraits were classified into "happy pictures" forty-nine times, and into "sad pictures" one time. Finally, out of a data pool of thirty "surprise" items, the children classified them into "happy pictures" eight times and into "sad pictures" twenty-two times. In other words, the 5-6 gp perceived the "anger", "contempt", and "fear" portraits as "sad" 82 percent of the time, the "love" portraits as "happy", for all intentional purposes, 100 percent of the time, and the "surprise" portraits as "sad" 73 percent of the time. These findings would suggest support for the frequently repeated statement that the full range of adult categories of emotion emerge out of an original two dimensional base. However the picture was less clear-cut when the responses were examined in more detail.

For example, portrait #5 (see Appendix G) an "angry" portrait, was classified as "happy" by all the 5-6 gp.

When questioned as to why they thought that portrait to be happy, some children answered: "because she is dressed up to go to a party". Other answers concerned "funny clothes". The point is that portrait #5 was not sufficiently discriminating in itself. It suggested happiness to the younger child because he perceived the costume-as-happy. The anger of the person in the portrait that the adult perceived was apparently not the main feature of the portrait to the child. It was interesting to note that the 7-8 gp categorized portrait #5 among the three categories (anger, contempt, fear) that the 5-6 gp had classified as "sad pictures"; that is, the 5-6 gp classified portrait #5 as "happy", and the Ss of the 7-8 gp individually classified it as anger or contempt or fear. The 7-8 child was beginning to perceive in adult categories, while the 5-6 child was perceiving from his own age gp categories. The three "surprise" portraits: #s 3, 4, and 24; were also not sufficiently discriminating for the 5-6 gp. Except for one S (#1), the 5-6 gp categorized portraits #s 3 and 4 as "sad", while only two Ss (#s 4 and 5) classified portrait #24 as "sad". Hence 85 percent of the above noted 73 percent of "surprise" portraits categorized as "sad" was accounted for by portraits, #s 3 and 4. However, the "surprise" portraits did follow a regular pattern after the 5-6 gp. Note that portraits #s 3 and 4 did receive "anger" or "contempt" or "fear categorizations before

emerging as predominantly "surprise" categorizations with the adult gp. Similarly, portrait #24 received mostly "love" categorizations before emerging as "surprise". The final problem with the 5-6 gp's performance was that this E felt that some of the categorizations may have been due to perseveration. The gp's overall performance would not seem to support that feeling. However this possibility would have to be explored before this test was used again with younger children.

These results, excluding the 5-6 gp's results, were cited as evidence of an increase in participation with age.

Int Sit. The means, standard deviations and variances, an analysis of variance, and comparisons of sample means were determined for each age gp on the Int Sit test. These results are found in Tables XXXII, XXXIII, and XXXIV respectively. Individual Ss' results are found in Appendix H(vi).

The Int Sit test is scored in terms of a seven point scale. No significant differences between adjacent age gps were found. This finding was partially a consequence of the generally cautious Js' scores, which can be seen in variance terms in Table XXXII or in raw score terms in Appendix H(vi). The nature of the actresses' "discussion problems" contributed to that caution. The younger children generally responded spontaneously. This made the judging of their performances a little easier to discriminate. The problems

TABLE XXXII

SAMPLE MEANS, STANDARD DEVIATIONS, AND VARIANCES FOR INTERVIEW SITUATION

	Groups				
	5-6	7-8	9-10	11-12	Adults
Means	5.46	5.33	4.88	4.08	4.21
S.D.	.72	.62	.76	1.30	1.15
Var.	.52	.38	.59	1.70	1.32

TABLE XXXIII

ANALYSIS OF VARIANCE FOR ALL GROUPS ON INTERVIEW SITUATION

Source	SS	DF	MS	F
Between Groups	25.97	4	6.49	5.94**
Within Groups	88.59	81	1.09	

F .95 (4,81) = 2.48

TABLE XXXIV

SCHEFFÉ MULTIPLE COMPARISONS FOR SAMPLE MEANS ON INTERVIEW SITUATION

Group	7-8	9-10	11-12	Adults
5-6	NS	NS	*	*
7-8		NS	NS	*
9-10			NS	NS
11-12				NS
Adults				

F. 95 4(4,81) = 9.92

were also of such a nature that the younger child "readily understood their importance". The adults on the other hand generally gave more reserved, practical, and problem solving type responses. This resulted in the Js having difficulty in discriminating the relative numerical value of their responses. The 11-12 gp, who obtained the lowest scores, also presented a special age gp problem. Except for one S (#46), this gp were more restrictive in their responses, that is, their responses generally related to themselves rather than relating to the person perceived (i.e., the actress). Responses like: "Yeah", and "You got a problem there"; were not uncommon. The Int Sit, which involved the perception of a person, as opposed to the other three tests which involved the perception of inanimate objects, was more difficult for the typical 11-12 S relative to his performance on the inanimate objects tests. This statement can be seen in correlational terms in Table XXXV. The correlations between the inanimate objects tests remained fairly constant within gps. The correlations between these tests and the Int Sit for the two youngest age gps were also fairly constant. But this latter relationship began to decrease in correlational score with the 9-10 gp, it reached bottom scores with the 11-12 gp, and rose again with the adult gp. One could see these measurement curves in terms

TABLE XXXV

CORRELATION MATRIX OF EXPRESSIVE LINES, EXPRESSIVE FACES, PORTRAIT SENSITIVITY, AND INTERVIEW SITUATION BY GROUP

Group		Exp Lin	Exp Fac	Por Sen	Int Sit
5-6	Exp Lin		.96	x	.82
	Exp Fac			x	.84
	Por Sen				x
	Int Sit				
7-8	Exp Lin		.82	.83	.89
	Exp Fac			.95	.88
	Por Sen				.85
	Int Sit				
9-10	Exp Lin		.69	.61	.54
	Exp Fac			.51	.64
	Por Sen				.22
	Int Sit				
11-12	Exp Lin		.77	.76	.11
	Exp Fac			.93	.02
	Por Sen				-.01
	Int Sit				
Adults	Exp Lin		.89	.81	.54
	Exp Fac			.84	.46
	Por Sen				.45
	Int Sit				

x -- Did not apply

of Werner's principle of orthogenesis.[33] Another, perhaps more parsimonious way of seeing these curves, is that the generally cautious judgements on the Int Sit Scale resulted in narrow ranges of scores. These narrow ranges did not affect the younger gps because the ranges for these gps were also high. But the generally low range of the 11-12 gp resulted in correlational vectors that were on the verge of an inverse relationship. In practice, had the score of every S in the 11-12 gp (excluding S #46) been raised by only one point, this gp's correlational scores would have been in line with the adjacent gps' scores in Table XXXV. The possibility of seeing these curves in terms of an interaction between the consequences of the orthogenetic principle and the measurement problems could not be excluded either.

Like the Exp Lin results, the Int Sit results as presented here could not be cited as evidence of an increase in participation with age. The individual performances in themselves had to be seen in relation to individual Ss' overall performance.

It was concluded that in the best estimate of this writer, by and large, participation, as it was measured, increased with age. In light of the myriad measurement

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[33]For a detailed analysis of the problem of person perception in relation to age using this principle as an explanatory tool see Gon, op. cit.

problems encountered, and individual Ss who were exceptions in one way or another to certain general trends, any conclusion which would have been more definite than this would have been unwarranted.

In sum: (1) four tests were operationally defined as tests of participation; (2) this battery of tests was found to be internally consistent for all age gps; (3) two of the tests, Exp Fac and Por Sen, produced statistically significant evidence of an increase in participation with age; (4) the other two tests, Exp Lin and Int Sit, produced inconclusive evidence of an increase in participation with age, but both discriminated the good from the poor performers with reference to a norm; and (5) the writer concluded an increase in participation with age, but cautioned the readers about the measurement difficulties in this problem area.

PART III

Developmental Interrelationships of the B-f and Participation Variables

We noted in Figure 6 that the straight line regression of the Y variable (KE or VE) on the X variable (KF or VF) was negative for all age gps, and that both Y and X decreased in gross value and in relative value with an increase in age. We also noted the general increase in the respective participation measurement curves with an increase

in age. The developmental interrelationships of the four B-f measures: KF, KE, VF and VE, and the four measures of participation were derived in terms of the Pearson 'r'. These are shown in Tables XXXVI, XXXVII, XXXVIII and XXXIX. A correlation matrix of the four B-f measures, by the four tests of participation, by the five age gps is shown in Table XL. The full picture can be more readily seen in this latter table.

In light of the analyses already behind us Table XL shows no real reversals of those trends. The magnitude of the relationship between the fixation scores and the participation scores were generally medium to low medium in range, and these variables were inversely related. The 5-6 gp VF:Exp Fac relationship was positive, but the numerical value of the coefficient was so low that it bordered on an inverse relationship. The 5-6 gp's high VF scores, and high variance of those scores (see Table IV), coupled with a narrow range of participation scores, resulted in low magnitude coefficients for that gp's three comparisons. Similarly the 11-12 gp's difficulties with the Int Sit (see Table XXXV) resulted in low magnitude coefficients with the fixation (and with the extinction) measures. The magnitude of the relationship between the extinction scores and the participation scores were generally medium to high medium in range, and these variables were positively related. The magnitudes of the adult gp's VE:

TABLE XXXVI

CORRELATION MATRIX FOR EXPRESSIVE LINES ON BODY-FLEXIBILITY TASK

	Groups				
	5-6	7-8	9-10	11-12	Adults
Kinesthetic Fixation	-.42	-.35	-.47	-.34	-.56
Kinesthetic Extinction	.92	.71	.77	.62	.44
Visual Fixation	-.08	-.55	-.58	-.68	-.57
Visual Extinction	.52	.85	.87	.75	.22

TABLE XXXVII

CORRELATION MATRIX FOR EXPRESSIVE FACES ON BODY-FLEXIBILITY TASKS

	Groups				
	5-6	7-8	9-10	11-12	Adults
Kinesthetic Fixation	-.44	-.24	-.33	-.39	-.55
Kinesthetic Extinction	.53	.64	.72	.66	.51
Visual Fixation	.01	-.49	-.52	-.48	-.64
Visual Extinction	.53	.72	.84	.74	.27

TABLE XXXVIII

CORRELATION MATRIX FOR PORTRAIT SENSITIVITY ON BODY-FLEXIBILITY TASKS

	Groups			
	7-8	9-10	11-12	Adults
Kinesthetic Fixation	-.28	-.27	-.47	-.55
Kinesthetic Extinction	.67	.66	.63	.32
Visual Fixation	-.57	-.44	-.59	-.44
Visual Extinction	.86	.84	.71	.13

TABLE XXXIX

CORRELATION MATRIX FOR INTERVIEW SITUATION ON BODY-FLEXIBILITY TASKS

	Groups				
	5-6	7-8	9-10	11-12	Adults
Kinesthetic Fixation	-.47	-.38	-.13	-.17	-.17
Kinesthetic Extinction	.74	.73	.33	.16	.45
Visual Fixation	-.04	-.59	-.47	-.13	-.10
Visual Extinction	.77	.64	.48	.16	.16

TABLE XL

COMPOSITE CORRELATION MATRIX OF TABLES XXXVI, XXXVII, XXXVIII AND XXXIX

	KINESTHETIC FIXATION				KINESTHETIC EXTINCTION				VISUAL FIXATION				VISUAL EXTINCTION			
Group	Exp Lin	Exp Fac	Por Sen	Int Sit	Exp Lin	Exp Fac	Por Sen	Int Sit	Exp Lin	Exp Fac	Por Sen	Int Sit	Exp Lin	Exp Fac	Por Sen	Int Sit
5-6	-.42	-.44	x	-.47	.92	.53	x	.74	-.08	.01	x	-.04	.52	.53	x	.77
7-8	-.35	-.24	-.28	-.38	.71	.64	.67	.73	-.55	-.49	-.57	-.59	.85	.72	.86	.64
9-10	-.47	-.33	-.27	-.13	.77	.72	.66	.33	-.58	-.52	-.44	-.47	.87	.84	.84	.48
11-12	-.34	-.39	-.47	-.17	.62	.66	.63	.16	-.68	-.48	-.59	-.13	.75	.74	.71	.16
Adults	-.56	-.55	-.55	-.17	.44	.51	.32	.45	-.57	-.64	-.44	-.10	.22	.27	.13	.16

x -- Did not apply

participation tests, coefficients were the exceptions to this latter magnitude trend. The small variance of the adult gp's VE scores (see Table IV), coupled with broad ranges of participation tests scores, resulted in low magnitude coefficients for that gp's four comparisons.

The detracting scores notwithstanding, it was concluded that the data shown in Table XL were solid nomothetic evidence of the predictive validity of the four B-f measures for each of the age gps; the four tests of participation were the criterion of prediction.

Individual Profiles

These data were also submitted to an idiographic analysis. The rationale was that, if the B-f measures had predictive validity in the nomothetic case, then they should also have predictive validity in the idiographic instances. See Appendix H from (i) to (vi). A S's idiographic profile is read by following his numerical designation across the H appendices. There are a number of ways to analyse these profiles. The most simple way for our immediate purposes was to take a S's score on any measure and designate it "good" or "poor" relative to his own gp's mean score on the same measure. Therefore a good performer on the B-f Ts scored above his gp's mean on the fixation measures, and below his gp's mean on the extinction measures. A good performer on the Exp Lin, Por Sen, and Int Sit tests scored above his gp's mean on these tests.

A good performer on the Exp Fac test scored below his gp's mean on that test.

An example is the first S of the 5-6 gp, S #1: (1) poor on the four B-f measures; (2) poor on Exp Lin; (3) poor on Exp Fac; (4) Por Sen did not apply; and (5) poor on Int Sit. Another example is the last S of the adult gp, S #86: (1) good on KF, poor on KE (0.13 trials above good); good on VF and VE; (2) good on Exp Lin; (3) good on Exp Fac; (4) good on Por Sen; and (5) good on Int Sit. The one reversal in S #86's profile was because his scores clustered about their respective means. A shift of a low order could easily come about in a profile of average scores. In fact such low order reversals were not unusual. There were twenty-nine Ss who had one reversal[34] in the B-f section of their respective profiles; these were: Ss #5, 11, 12, 14, 19, 26, 30, 32, 35, 45, 47, 48, 51, 52, 53, 55, 57, 60, 61, 62, 63, 64, 65, 69, 71, 76, 78, 83, 86; and eleven Ss who had two reversals in the B-f section of their respective profiles; these were: Ss # 6, 8, 16, 39, 49, 70, 73, 74, 75, 79, 81. The Ss who had one B-f reversal, such as S #86, were the borderline cases whose participation score designations generally followed their dominant B-f score designation, i.e., if the dominant B-f designation was good, then the participation designations

[34]The reversals discussed here were of both types, i.e., good to poor, and poor to good.

were generally good; and the opposite. The Ss who had two B-f reversals were also borderline cases, but their participation designations generally also had reversals in them, i.e., if there were two reversals in the B-f designations, then there were generally more than one reversal in the participation designations. The remaining forty-six Ss, those who had no reversals in their B-f designations, had participation designations that were generally the same, i.e., if the B-f designations were all good, then the participation designations were generally all good; and the opposite. When exceptions occurred to this latter trend, it was usually the Int Sit designation that was reversed. For example, S #82 who otherwise had an outstanding (good) profile had a reversal on his Int Sit designation.

It was interesting to note the predictive validity of the Imaginal KB-f T. The profiles of the Ss who performed the Imaginal task (see Appendix H(ii)) only provided support for the statements made on pages 162-165. It could not be said that the child who performed the imaginal task also had an overall poor profile. Their profiles only suggested (a suggestion helped by a heavy dose of reading in from a Wernerian frame of reference) that had the sample been larger, perhaps, this would have been the case. It could be predicted however, that if an adult performed the Imaginal task, then his overall profile would also be good. Every adult in this sample who did perform

the Imaginal task had individual scores that were in the ninth decile of the respective ranges. The two exceptions to this latter trend were Ss #78 and 82 who had slight reversals on the Int Sit.

The predictive validity of the B-f measures in the idiographic instances were, of course, subject to a variety of exceptions and qualifications. It was nonetheless concluded that good or poor performances on the tests of participation could be expected to follow from good or poor performances on the four measures of B-f.

FINAL CONCLUSION

The general hypothesis was supported. There was a significant and positive relationship between performance on the B-f Ts and performance on the tests of participation. The independent variable successfully predicted the level of performance on the dependent variable for each age gp. However, the possibility that the variables were not mutually exclusive could not be precluded, and as such, the significant relationships could have been due to mutual contamination.

IV

> However, one should not think slightingly of the paradoxical; the paradox is the source of the thinker's position, and the thinker without paradox is like a lover without feeling: a paltry mediocrity.
>
> Kierkegaard, Fragments

In Chapter I we asked three questions: (1) What is the nature of the development of participative perception? (2) What is the nature of the development of B-f? (3) What is the relationship of participation to B-f? We translated these questions into an experimental design and answered: (1) participation increases in ontogenesis; (2) B-f increases in ontogenesis; and (3) the increase in participation is a function of the increase in B-f. Let us once again look at the questions and at the answers.

Church hypothesized a developmental continuum from immature to mature in participative perception. Our evidence supported that hypothesis. The assumption underlying our support is that we did measure the perceiver's more-or-less unmediated responses to the physiognomic meaning-qualities of his behavioural field. The answer to the question—were we justified in making this assumption—is not cut and dried.

The experimental design: rationale, procedures, materials, statistics, Ss, controls, conclusions, etc., used to measure what was operationally defined as "participation"

was sound—in terms of experimental design. This does not mean that the participation variable was isolated into a pure form then measured in its developmental progression. On the one hand, pure participation is an abstraction—a point somewhere along a continuum where a mature perceiver experiences a reality unfettered by his contemplative categories of thought. Closer to the center of this continuum, the section of the continuum which concerns me-as-research-worker, this variable is less pure. The organismic behaviour remains the same, that is, the participative perception remains as a reflex-like way of mobilizing toward the expressions of the world, but in this section the variable becomes clothed in the perceiver's contemplative categories of thought. During development the participative mode of perception becomes more mature in the sense that the range of expressions to which it becomes sensitive increases quantitatively and differentiates qualitatively. The emphasis also changes from sensitivity to expressions which are of significance to the organism qua organism to expressions which are of cultural significance to the organism. The development from immature to mature is given the occasion to occur because of this clothing. This clothing—this gradual educational transformation of biological potential into a full human being—was also being measured in this paradigm. On the other hand, the most which can be expected of a "tough minded" experimental design

in this "tender minded" area of research is that from amongst whatever else it may have tapped it also tapped a large measure of some manifestations of the participation variable. Like the variable itself, the experimental design was a more-or-less thing. We assumed that given these qualifications, and those mentioned above in regard to norms, item reliability, and procedural problems, that more, rather than less of the participation variable was tapped by this experimental design.

Piaget's counter hypothesis that participation decreases in ontogenesis was not supported. Yet it seems likely that Piaget would agree with our statement that contemplation (our term) elaborates the range of participation. He would probably qualify his agreement by noting that what we are calling the development of participation is really the development of contemplation, and in a sense he would be right. But the issue here is not are participation and contemplation interrelated. We acknowledge that the phenomena of contemplation elaborate the phenomena of participation. The issue here is: Do we concentrate our efforts on trying to conceptualize and understand the nature of the development of cognition, with the degree of development seen in terms of successive approximations to artifacts of Euclidean mathematics? Or: Do we concentrate on trying to conceptualize and understand how the myriad phenomena which constitute cognition are interrelated and how they

affect each other in development? The answers to the latter question might be more fruitful. An experimental design using our battery of tests, as one way of measuring the development of the participative mode of cognition, coupled with an analysis of the structure of language used by different age gps would be helpful in this regard. For example, the interrelatedness of Bernstein's[1] linguistic codes "to the verbalizations to the Exp Lin, and/or the interrelatedness of Gon's[2] "differentiation dimensions" and "modes of organization dimensions" to the requirements of the person perception paradigm of the Int Sit would be promising starting points. A factor analysis design: (1) using our battery of participation tests; (2) by Piaget's tests of cognitive efficency; (3) by age gp; (4) in a test-retest design; (5) coupled with certain intervention procedures designed to alter the course of development could also reveal interesting findings.

A major issue here is that a phenomenological analysis of the lived world of not only primitives, artists, and children, but also of adults suggests that the participative mode of cognition is part of experience. Strasser's[3] description of the "everyday world as a 'primitive' world"

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[1]Bernstein, op. cit.

[2]Gon, op. cit.

[3]S. Strasser (U. Louvain), Phenomenology and the Human Sciences (1963), pp. 88-97.

is by itself eloquent testimony to the existence of participation as, in his terms, "an everyday phenomenon for one and for all." If we as developmentalists are to understand how this "everyday phenomenon" develops, and if we are to try and find ways to nurture its development, then we must on the one hand recognize that it exists, and on the other hand, bring the phenomenon into our laboratories. If we construct laws of cognitive development which ignore certain phenomena of cognition as revealed by other researchers using different tools to get at similar problems, then our laws will become artificial, and our experimental evidences will likewise reflect that artificiality.

This writer offered the hypothetical construct termed "body-flexibility" both as a way of conceptualizing cognitive development and as an explanatory tool; participation was the phenomenon of cognition it attempted to explain. The gist of the construct is that consciousness emerges in ontogenesis as part of the relational dialectic between body:world. This emergence is conceptualized in terms of the degree of B-f of the perceiver, by which we mean, the degree of consciousness of the perceiver in relation to the objects or to the expressions of objects in the world. We suggested that consciousness is an intentional relationship of the body with the objects of the world; and that the consciousness of the object is given to the perceiver not in terms of bits of isolated stimuli, but in

terms of a body-schema. This body-schema functions not only in terms of the relations of the body to the world, and the world to the body, but also in terms of the relations of the body to itself, that is, consciousness of and to things "out there", and consciousness of and to things "in here" function in terms of a body-schema. The consciousness "in here"—the consciousness of being to the existentialists[4]—is conceptualized in terms of the body-as-subject and body-as-object of experience. We suggested that part of the cognitive life of the perceiver could be conceptualized as oscillating in the gap between the body-as-subject and body-as-object. The deeper and wider and more flexible the gap the greater the consciousness of being or functioning, the greater the gap between the poles of being, the greater the ability to look at oneself looking at something. This ability we termed "distantiation". We suggested that because consciousness is also a reciprocal relationship, that is, because we also perceive the expressions of the world in terms of the body, the greater the ability to distantiate, the greater the consciousness of phenomena—such as the phenomenon of participation.

We also suggested that this ability develops in ontogenesis. The neonate is conceptualized as having no ability to distantiate, he is completely embedded in the

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[4]Cf., A. Maslow (Brandeis U.), Existential psychology: what's in it for us, in R. May, ed., Existential Psychology (1960).

world and has no consciousness of functioning. This ability develops through the process of schematization. On the one hand, schematization establishes the polarization of the body and the experienced world. On the other hand, schematization establishes the subjective and objective poles of being in relation to the experienced world. These reciprocal processes work together to allow the infant to pull himself out of his original embeddedness. We suggested that these cognitive dynamics emerge in ontogenesis, and that this emergence could be seen as a creative process. The world creates the child and the child re-creates the world in terms of his emerging consciousness.

These conceptualizations were operationalized in terms of B-f Ts. Our hypotheses that B-f increases in ontogenesis, and that participation increases as a function of the increase in B-f were supported. What we have thereby done, is made an initial attempt at translating some of the insights of other disciplines into the developmental perspective. The translation was not exact. It was not intended to be. What can now be done in future research to help clarify the issues is: (1) a norming study on the B-f Ts; (2) a detailed inquiry into the interrelationships of the four B-f measures, and their relationships to the two haptic measures; and (3) experiments designed to see if the B-f measures are parsimonious predictors of other psychological phenomena.

The conceptual and operational attempts of this thesis are seen by this writer as pointing toward a theory of perception. The conceptualization and operational demonstration of the relative abilities to experience the body in relation to the kinesthetic and visual modalities, the conceptualization and operational demonstration that the emergence of this ability follows a lawful and predictable developmental sequence, the conceptualization and operational demonstration that the degree of this ability, termed the degree of body-flexibility, can be used as a predictor of performance on tests of participation, the hint that the ability to imaginally mobilize the body may be related to the degree of body-flexibility, the integration of all these conceptualizations and operational demonstrations does not a theory make. They point toward a theory of perception—no more than that—but, no less than that.

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A P P E N D I X A

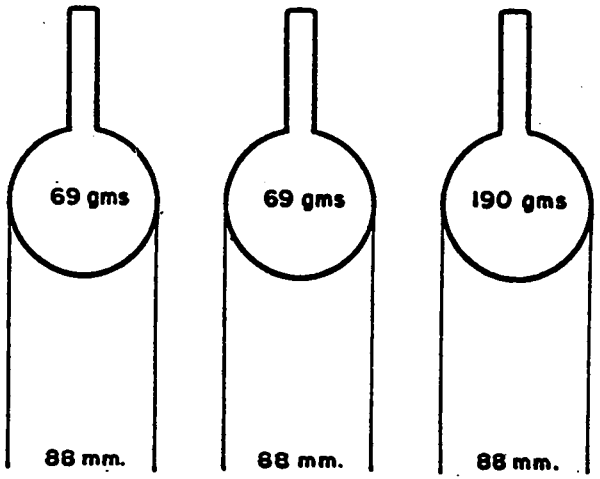
KINESTHETIC BODY-FLEXIBILITY TASKS

A P P E N D I X B

VISUAL BODY-FLEXIBILITY TASKS

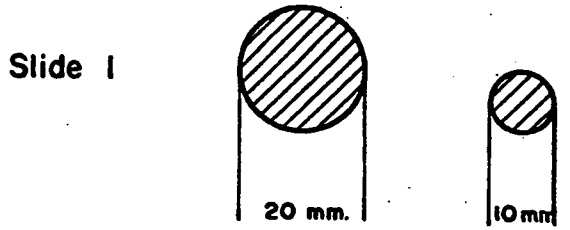
APPENDIX A

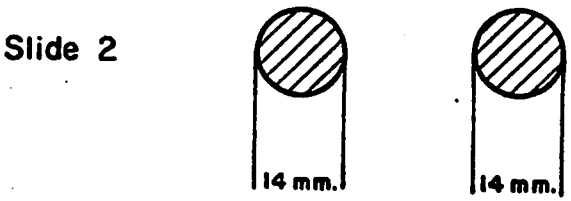
KINESTHETIC BODY-FLEXIBILITY TASKS

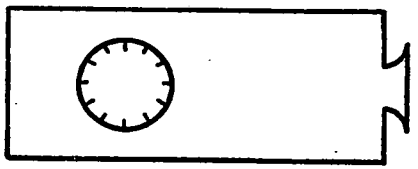


APPENDIX B

VISUAL BODY-FLEXIBILITY TASKS







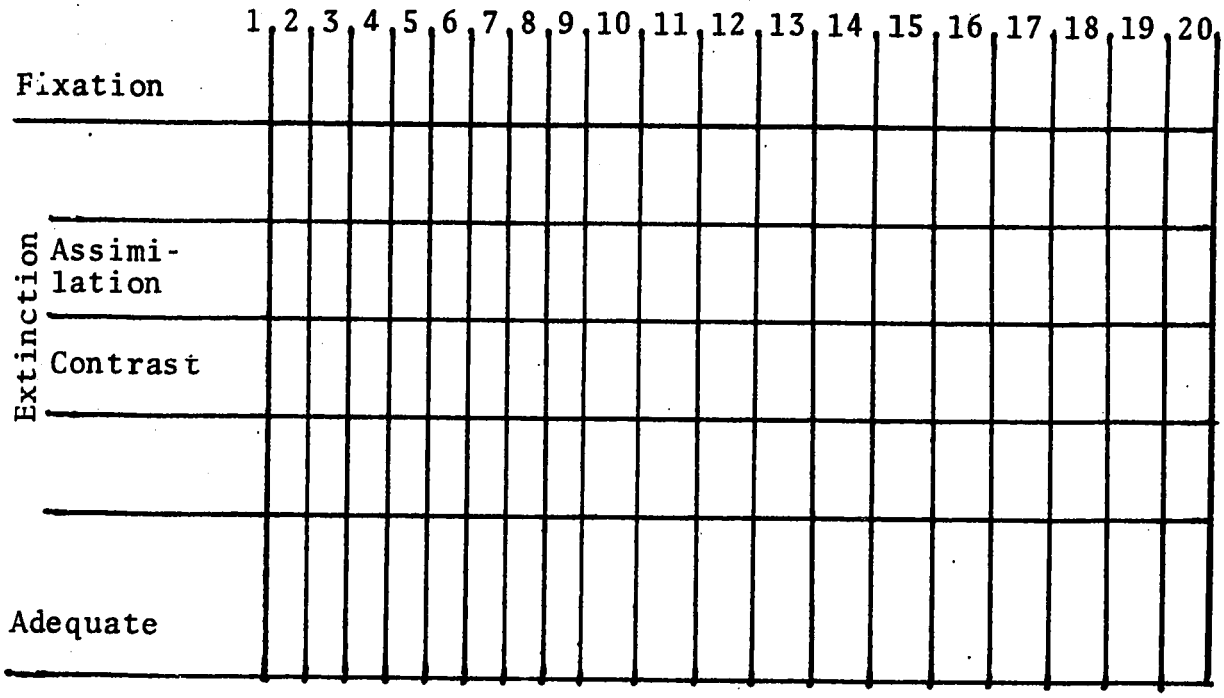
TACHISTOSCOPE

A P P E N D I X C

BODY-FLEXIBILITY TASK SCORING SHEET

APPENDIX C

BODY-FLEXIBILITY TASK SCORING SHEET



A P P E N D I X D

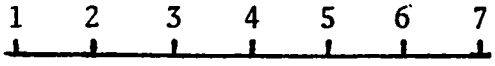
EXPRESSIVE LINES AND BEST ANSWERS

APPENDIX D

EXPRESSIVE LINES AND BEST ANSWERS

	Exp Lin	Best Answer
1		Happy, Glad, Strong
2		Strong, Hard, Heavy
3		Playful, Merry, Happy
4		Sad, Weak, Lazy, Tired
5		Strong, Heavy, Hard
6		Happy, Merry, Playing
7		Weak, Thin, Light
8		Happy, Merry, Jolly
9		Mad, Angry, Hot

Note: a. The Ss' responses, shown in Appendix H(iii), were in terms of their approximations to these best answers as evaluated by two Js on a seven point scale.



A P P E N D I X E

EXPRESSIVE FACES IN TERMS OF CORRECT MATCHINGS

APPENDIX E

EXPRESSIVE FACES IN TERMS OF CORRECT MATCHINGS

PANEL 1	R5	FW47	FW31	FW22
INDIVIDUAL CARDS	FW9	R8	R17	R13
PANEL 2	R12	FW19	FW56	R1
INDIVIDUAL CARDS	FW17	R20	R6	FW38
PANEL 3	FW53	R3	FW68	FW70
INDIVIDUAL CARDS	R7	FW46	R27	R29
PANEL 4	R10	FW28	R30	FW52
INDIVIDUAL CARDS	FW7	R24	FW32	R26
PANEL 5	R23	FW13	R25	R31
INDIVIDUAL CARDS	FW26	R11	FW11	FW72

Notes: a. R = Ruckmick photographs
b. FW= Frois-Wittman photographs
c. The adjacent numbers are the designations given by the photographers.
d. The Ss' responses, shown in Appendix H(iv), were in terms of the number of errors of matching with the above used as the scoring key.

A P P E N D I X F

PORTRAIT SENSITIVITY TEST ITEMS AND CORRECT CATEGORIZATIONS

APPENDIX F

PORTRAIT SENSITIVITY TEST ITEMS AND CORRECT CATEGORIZATIONS

Item	Catalogue Number	Title of Portrait and Name of Artist	Category of Emotion
1	B353	Il Condottiere - Antonello da Messin C1430-1479	A
2	C349	Padre Servito Grand (Detail of Feast of St. Gregory) - Veronese 1528-1588	F
3	D68	Portrait of a Man with Rosary - Gossaert (Mabuse) c 1478-1535	S
4	D153	Galileo - Suttermans 1597-1681	S
5	D191	Portrait of a Lady - Van Miereveld 1567-1641	A
6	D196	Portrait of a Man - Hals 1580?-1666	L
7	D201	La Bohemienne - Hals 1580-1666	L
8	D262	Titus - Rembrandt van Rijn 1606-1669	L
9	D265	Portrait of the Artist - Rembrandt van Rijn 1606-1669	A
10	D282	Paul Potter - Van der Helst 1613-1670	C
11	D390	Portrait of Durer's Father - Durer, 1471-1528	F
12	D411	Hans Imhoff - Durer 1471-1528	A
13	D444	Portrait of a Man - Amberger 1500-1561	F
14	E3	Francis I - Jean Clouet Act. 1516-1540	C
15	E13	The Viscount de Turenne - Champaigne 1602-1674	C

Item	Catalogue Number	Title of Portrait and Name of Artist	Category of Emotion
16	E45	Self Portrait, Pastel 1751- Maurice Quentin de la Tour 1704-1788	L
17	E245	Dona Isabel Cobos de Porcel 1806. Goya, 1746-1828	L
18	E264	Louis Guillaume - Cezanne, 1839-1906	F
19	F84	Mrs. Siddons - Lawrence 1769-1830	F
20	H219	Lilya - Speicher 1883 -	C
21	H270	Portrait of Mrs. Edith Mahon - Eakins, 1844-1916	F
22	MH14	Ann Pollard - Unknown Limner C-1721	F
23	P35	Portrait of the Artist - Rembrandt van Rijn, 1606-1669	C
24	P168	The Girl with a Red Hat - Vermeer, 1632-1675	S

Notes: a. The item number corresponds to designations shown in Appendix H(v).
b. The catalogue number is the Harvard Univ. Prints number.
c. The category of emotion designations are the correct categorizations and correspond to the designations shown in Appendix H(v).
d. The specific wording of the category of emotion cards were:

1. LOVE happiness
2. SURPRISE
3. Fear suffering
4. CONTEMPT
5. ANGER determination

A P P E N D I X G

SEVEN POINT INTERVIEW SITUATION RATING SCALE

APPENDIX G

SEVEN POINT INTERVIEW SITUATION RATING SCALE

1. Openly rejecting, Critical, Argumentative, Ignores feelings of Other. Only own feelings expressed.

2. Moderately critical, Withdrawn, Disapproves or Withdraws.

3. Moderately directing, Taking the lead, or Distant. Structuring with suggestions, Actively involved in activity of his own.

4. Mildly unaccepting. Involved in a mildly directive way but with a spirit of cooperativeness.

5. Alert, Permissive, but not Responding as below (6). Interested, but not necessarily involved in either a verbal or active manner

6. Accepting without judgement. Allows other to make comment without imposing evaluation or criticism. Shows affect, yet acceptance not conveyed as fully as in (7).

7. Highest level of participative communication. Evidences complete ability to take part in feelings and to convey by tone and content that the "other's" feeling is perceived and accepted. May include role playing in response to "other's" solicitation.

Note: a. The Ss' responses, shown in Appendix H(vi), were in terms of their performance as evaluated by two Js using this scale as their frame of reference.

A P P E N D I X H (i)

DISTRIBUTION OF SCORES ON KINESTHETIC BODY-FLEXIBILITY AND VISUAL BODY-FLEXIBILITY TASKS

5-6 gp

		Trials																			
	S#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
KINESTHETIC Fixation	1	x																			
	2	x																			
	3	x	x	x																	
	4	x																			
	5	x	x	x																	
	6	x																			
	7	x																			
	8	x																			
	9	x	x	x																	
	10	x																			
	11	x	x	x																	
	12	x	x	x																	
KINESTHETIC Extinction	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
	2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
	3	x	x	x	x	x	x	x	x	x	x	x									
	4	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					
	5	x	x	x	x	x	x	x	x	x	x	x	x								
	6	x	x	x	x	x	x	x	x	x	x	x	x	x							
	7	x	x	x	x	x	x	x	x	x	x	x	x								
	8	x	x	x	x	x	x	x	x	x	x	x	x								
	9	x	x	x	x	x	x	x	x	x	x	x									
	10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
	11	x	x	x	x	x	x	x	x	x	x	x									
	12	x	x	x	x	x	x	x	x	x	x	x	x								
VISUAL Fixation	1	x																			
	2	x																			
	3	x	x	x																	
	4	x																			
	5	x																			
	6	x																			
	7	x																			
	8	x																			
	9	x	x	x																	
	10	x																			
	11	x																			
	12	x																			
VISUAL Extinction	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
	2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
	3	x	x	x	x	x	x	x	x	x	x	x	x								
	4	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
	5	x	x	x	x	x	x	x	x	x	x	x	x	x							
	6	x	x	x	x	x	x	x	x	x	x	x	x	x							
	7	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
	8	x	x	x	x	x	x	x	x	x	x	x	x	x							
	9	x	x	x	x	x	x	x	x	x	x	x	x								
	10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
	11	x	x	x	x	x	x	x	x	x	x	x	x	x							
	12	x	x	x	x	x	x	x	x	x	x	x	x	x							

7-8 gp

KINESTHETIC

S#	Trials 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Fixation																				
13	x	x	x																	
14	x	x	x																	
15	x																			
16	x	x	x																	
17	x																			
18	x																			
19	x																			
20	x	x	x																	
21	x	x	x																	
22	x	x	x																	
23	x																			
24	x																			
Extinction																				
13	x	x	x	x	x	x	x	x	x	x										
14	x	x	x	x	x	x	x	x	x	x	x									
15	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					
16	x	x	x	x	x	x	x	x	x	x										
17	x	x	x	x	x	x	x	x	x	x	x									
18	x	x	x	x	x	x	x	x	x	x	x	x								
19	x	x	x	x	x	x	x	x	x	x	x									
20	x	x	x	x	x	x	x	x												
21	x	x	x	x	x	x	x	x												
22	x	x	x	x	x	x	x	x												
23	x	x	x	x	x	x	x	x	x	x	x	x	x							
24	x	x	x	x	x	x	x	x	x	x	x	x	x	x						

VISUAL

S#	Trials 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Fixation																				
13	x	x	x	x	x	x														
14	x	x	x																	
15	x																			
16	x	x	x																	
17	x	x	x																	
18	x	x	x																	
19	x	x	x																	
20	x	x	x	x	x	x														
21	x	x	x	x	x	x														
22	x	x	x	x	x	x														
23	x																			
24	x																			
Extinction																				
13	x	x	x	x	x	x	x	x	x	x										
14	x	x	x	x	x	x	x	x	x	x	x	x								
15	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
16	x	x	x	x	x	x	x	x	x	x	x	x								
17	x	x	x	x	x	x	x	x	x	x	x	x	x							
18	x	x	x	x	x	x	x	x	x	x	x	x	x							
19	x	x	x	x	x	x	x	x	x	x										
20	x	x	x	x	x	x	x	x	x	x										
21	x	x	x	x	x	x	x	x	x											
22	x	x	x	x	x	x	x	x	x											
23	x	x	x	x	x	x	x	x	x	x	x	x								
24	x	x	x	x	x	x	x	x	x	x	x	x								

9-10 gp

			S#	Trials 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
KINESTHETIC	Fixation		25	x	x	x																	
			26	x	x	x																	
			27	x																			
			28	x																			
			29	x																			
			30	x																			
			31	x	x	x																	
			32	x																			
			33	x	x	x																	
			34	x																			
			35	x																			
			36	x																			
	Extinction		25	x	x	x	x	x	x	x													
			26	x	x	x	x	x	x	x	x	x	x										
			27	x	x	x	x	x	x	x	x	x	x	x	x								
			28	x	x	x	x	x	x	x	x	x	x										
			29	x	x	x	x	x	x	x	x	x	x	x	x								
			30	x	x	x	x	x	x	x	x	x											
			31	x	x	x	x	x	x	x													
			32	x	x	x	x	x	x	x	x	x	x										
			33	x	x	x	x	x	x	x													
			34	x	x	x	x	x	x	x	x	x	x	x	x								
			35	x	x	x	x	x	x	x	x												
			36	x	x	x	x	x	x	x	x	x	x	x	x								
VISUAL	Fixation		25	x	x	x	x	x	x														
			26	x	x	x	x	x	x														
			27	x	x	x																	
			28	x	x	x																	
			29	x	x	x																	
			30	x	x	x																	
			31	x	x	x	x	x	x														
			32	x	x	x	x	x	x														
			33	x	x	x	x	x	x														
			34	x																			
			35	x	x	x																	
			36	x	x	x																	
	Extinction		25	x	x	x	x	x	x	x													
			26	x	x	x	x	x	x	x	x												
			27	x	x	x	x	x	x	x	x	x	x	x	x								
			28	x	x	x	x	x	x	x	x	x	x										
			29	x	x	x	x	x	x	x	x	x	x										
			30	x	x	x	x	x	x	x	x	x											
			31	x	x	x	x	x	x	x													
			32	x	x	x	x	x	x	x	x	x											
			33	x	x	x	x	x	x														
			34	x	x	x	x	x	x	x	x	x	x	x	x								
			35	x	x	x	x	x	x	x	x	x											
			36	x	x	x	x	x	x	x	x	x	x										

11-12 gp

			Trials																		
		S#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
KINESTHETIC	Fixation	37	x																			
		38	x	x	x																	
		39	x																			
		40	x	x	x																	
		41	x	x	x																	
		42	x																			
		43	x	x	x																	
		44	x																			
		45	x	x	x																	
		46	x	x	x																	
		47	x																			
		48	x																			
	Extinction	37	x	x	x	x	x	x	x	x	x											
		38	x	x	x	x	x	x														
		39	x	x	x	x	x	x	x	x												
		40	x	x	x	x	x	x														
		41	x	x	x	x	x	x	x													
		42	x	x	x	x	x	x	x	x	x	x										
		43	x	x	x	x	x	x	x													
		44	x	x	x	x	x	x	x	x	x											
		45	x	x	x	x	x	x	x	x												
		46	x	x	x	x	x	x														
		47	x	x	x	x	x	x	x	x	x											
		48	x	x	x	x	x	x	x	x	x											
VISUAL	Fixation	37	x	x	x																	
		38	x	x	x	x	x	x														
		39	x	x	x	x	x	x														
		40	x	x	x	x	x	x	x	x	x	x										
		41	x	x	x	x	x	x														
		42	x	x	x																	
		43	x	x	x	x	x	x														
		44	x	x	x																	
		45	x	x	x	x	x	x	x	x	x	x										
		46	x	x	x	x	x	x														
		47	x	x	x																	
		48	x	x	x																	
	Extinction	37	x	x	x	x	x	x	x	x	x											
		38	x	x	x	x	x	x	x													
		39	x	x	x	x	x	x	x													
		40	x	x	x	x	x	x														
		41	x	x	x	x	x	x	x													
		42	x	x	x	x	x	x	x	x	x											
		43	x	x	x	x	x	x	x													
		44	x	x	x	x	x	x	x	x												
		45	x	x	x	x	x	x														
		46	x	x	x	x	x	x														
		47	x	x	x	x	x	x	x	x												
		48	x	x	x	x	x	x	x	x												

Adult gp

KINESTHETIC

	S#	Trials 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Fixation	49	x	x	x	x	x	x	x	x	x	x										
	50	x	x	x																	
	51	x																			
	52	x																			
	53	x	x	x	x	x	x														
	54	x																			
	55	x																			
	56	x	x	x																	
	57	x																			
	58	x	x	x	x	x	x														
	59	x	x	x	x	x	x														
	60	x																			
	61	x																			
	62	x																			
	63	x																			
	64	x																			
	65	x																			
	66	x	x	x																	
	67	x	x	x	x	x	x														
	68	x																			
	69	x																			
	70	x																			
	71	x																			
	72	x	x	x																	
	73	x																			
	74	x																			
	75	x																			
	76	x	x	x																	
	77	x	x	x																	
	78	x																			
	79	x																			
	80	x																			
	81	x																			
	82	x	x	x	x	x	x														
	83	x																			
	84	x	x	x	x	x	x	x	x	x	x										
	85	x	x	x																	
	86	x	x	x																	
Extinction	49	x	x	x	x	x	x	x	x	x	x										
	50	x	x	x	x	x	x														
	51	x	x	x	x	x	x	x													
	52	x	x	x	x	x	x	x													
	53	x	x	x	x	x	x														
	54	x	x	x	x	x	x	x	x												
	55	x	x	x	x	x	x	x	x												
	56	x	x	x	x	x	x														
	57	x	x	x	x	x	x	x													
	58	x	x	x	x	x	x														
	59	x	x	x	x	x	x														
	60	x	x	x	x	x	x	x													
	61	x	x	x	x	x	x	x													

Adult gp

KINESTHETIC Extinction

S#	Trials 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
62	x	x	x	x	x	x	x	x												
63	x	x	x	x	x	x														
64	x	x	x	x	x	x														
65	x	x	x	x	x	x														
66	x	x	x	x	x	x														
67	x	x	x	x	x	x														
68	x	x	x	x	x	x	x	x												
69	x	x	x	x	x	x	x													
70	x	x	x	x	x	x	x													
71	x	x	x	x	x	x	x	x												
72	x	x	x	x	x	x														
73	x	x	x	x	x	x	x													
74	x	x	x	x	x	x														
75	x	x	x	x	x	x														
76	x	x	x	x	x	x														
77	x	x	x	x	x	x														
78	x	x	x	x	x	x	x													
79	x	x	x	x	x	x	x													
80	x	x	x	x	x	x	x	x												
81	x	x	x	x	x	x	x	x												
82	x	x	x	x	x	x														
83	x	x	x	x	x	x	x	x												
84	x	x	x	x	x	x														
85	x	x	x	x	x	x														
86	x	x	x	x	x	x	x													

VISUAL Fixation

S#	Trials 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
49	x	x	x	x	x	x														
50	x	x	x	x	x	x														
51	x	x	x																	
52	x	x	x																	
53	x	x	x																	
54	x																			
55	x	x	x																	
56	x	x	x	x	x	x														
57	x	x	x																	
58	x	x	x	x	x	x	x	x	x	x		x								
59	x	x	x	x	x	x	x	x	x	x		x								
60	x	x	x																	
61	x	x	x																	
62	x	x	x																	
63	x	x	x	x	x	x														
64	x	x	x	x	x	x														
65	x	x	x	x	x	x														
66	x	x	x	x	x	x														
67	x	x	x	x	x	x	x	x	x	x		x								
68	x	x	x																	
69	x	x	x	x	x	x														
70	x	x	x	x	x	x														
71	x	x	x	x	x	x														
72	x	x	x	x	x	x	x	x	x	x		x								
73	x	x	x	x	x	x														
74	x	x	x	x	x	x														

Adult gp

VISUAL

	S#	Trials 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Fixation	75	x	x	x	x	x	x														
	76	x	x	x																	
	77	x	x	x	x	x	x														
	78	x	x	x	x	x	x														
	79	x	x	x	x	x	x														
	80	x	x	x																	
	81	x	x	x	x	x	x														
	82	x	x	x	x	x	x	x	x	x	x										
	83	x	x	x																	
	84	x	x	x	x	x	x	x	x	x	x										
	85	x	x	x	x	x	x														
	86	x	x	x	x	x	x														
Extinction	49	x	x	x	x	x	x	x													
	50	x	x	x	x	x	x														
	51	x	x	x	x	x	x														
	52	x	x	x	x	x	x														
	53	x	x	x	x	x	x														
	54	x	x	x	x	x	x	x	x	x											
	55	x	x	x	x	x	x														
	56	x	x	x	x	x	x														
	57	x	x	x	x	x	x														
	58	x	x	x	x	x	x														
	59	x	x	x	x	x	x														
	60	x	x	x	x	x	x														
	61	x	x	x	x	x	x														
	62	x	x	x	x	x	x														
	63	x	x	x	x	x	x														
	64	x	x	x	x	x	x														
	65	x	x	x	x	x	x														
	66	x	x	x	x	x	x														
	67	x	x	x	x	x	x														
	68	x	x	x	x	x	x	x													
	69	x	x	x	x	x	x	x													
	70	x	x	x	x	x	x														
	71	x	x	x	x	x	x	x													
	72	x	x	x	x	x	x														
	73	x	x	x	x	x	x														
	74	x	x	x	x	x	x														
	75	x	x	x	x	x	x														
	76	x	x	x	x	x	x														
	77	x	x	x	x	x	x														
	78	x	x	x	x	x	x	x													
	79	x	x	x	x	x	x														
	80	x	x	x	x	x	x	x													
	81	x	x	x	x	x	x														
	82	x	x	x	x	x	x														
	83	x	x	x	x	x	x														
	84	x	x	x	x	x	x														
	85	x	x	x	x	x	x														
	86	x	x	x	x	x	x														

A P P E N D I X H (ii)

SUBJECTS EXHIBITING IMAGINAL KINESTHETIC FIXATION

APPENDIX H (ii)

SUBJECTS EXHIBITING IMAGINAL KINESTHETIC FIXATION

Group		S#							
	5-6	1	3	4	6	8	9	10	11
	7-8	13	14	19					
	9-10	Nil							
	11-12	Nil							
	Adults	56	58	59	66	67	77	82	

A P P E N D I X H (iii)

DISTRIBUTION OF SCORES (AVERAGED OVER JUDGES RATINGS) ON EXPRESSIVE LINES TEST

APPENDIX H (iii)

DISTRIBUTION OF SCORES (AVERAGED OVER JUDGES RATINGS) ON EXPRESSIVE LINES TEST

5-6 gp

S#	Items 1	2	3	4	5	6	7	8	9	Gross Score	Item Score
1	1.0	3.0	6.5	6.5	3.0	1.0	3.0	1.5	5.0	30.5	3.39
2	1.0	3.0	1.0	1.0	3.5	1.0	3.0	1.0	5.0	19.5	2.17
3	6.5	6.5	6.5	6.5	6.0	6.5	5.5	6.5	6.5	57.0	6.33
4	1.0	3.0	1.0	1.5	1.0	1.0	1.5	6.0	3.0	19.0	2.11
5	6.5	3.0	6.0	1.5	6.0	1.0	3.0	6.5	5.0	38.5	4.28
6	6.5	3.0	1.0	1.0	3.0	1.0	3.0	1.0	3.0	22.5	2.50
7	6.5	2.0	1.0	1.0	2.0	2.0	3.0	1.5	3.0	22.0	2.44
8	1.0	3.0	6.5	1.0	3.0	1.0	2.0	4.5	6.5	28.5	3.17
9	7.0	3.0	4.5	3.0	3.5	6.5	6.5	7.0	1.5	42.5	4.72
10	6.5	3.5	6.5	4.0	5.5	6.0	3.0	6.5	1.5	43.0	4.78
11	6.5	3.0	6.5	7.0	3.5	1.5	6.5	1.0	2.0	37.5	4.17
12	1.0	2.5	6.5	1.5	4.0	6.5	5.0	6.5	5.0	38.5	4.28
Gross Score	51.0	38.5	53.5	35.5	44.0	35.0	45.0	49.5	47.0	399.	44.34
Item Mean	4.25	3.21	4.46	2.97	3.67	2.92	3.75	4.13	3.92	33.29	3.70

7-8 gp

S#											
13	6.5	3.0	6.0	1.0	3.0	5.0	3.0	1.0	6.5	35.0	3.89
14	0.0	1.5	4.5	5.0	1.5	6.5	6.5	1.0	0.0	26.5	2.94
15	1.0	2.0	1.0	1.0	1.0	1.5	1.0	1.5	2.0	12.0	1.33
16	5.5	3.0	2.5	4.0	6.5	1.0	3.5	1.5	1.0	28.5	3.17
17	1.0	3.0	1.0	1.0	1.0	1.0	1.0	1.5	1.0	11.5	1.28
18	1.0	4.0	1.0	5.5	4.0	1.0	2.0	1.0	1.0	20.5	2.28
19	6.5	1.5	6.5	1.5	6.0	7.0	3.0	6.5	5.0	43.5	4.83
20	5.5	2.0	5.0	1.0	2.0	6.0	2.0	6.0	4.0	33.5	3.72
21	6.5	6.5	6.0	7.0	6.5	2.0	2.0	6.0	1.0	43.5	4.83
22	2.0	6.5	6.5	1.0	5.5	4.0	6.5	6.5	6.5	45.0	5.00
23	4.0	3.0	3.5	1.5	3.0	3.0	2.0	3.0	3.5	26.5	2.94
24	6.5	3.0	6.5	1.0	3.0	1.0	3.0	1.0	5.0	30.0	3.33
Gross Score	46.0	39.0	50.0	30.5	43.0	39.0	35.5	36.5	36.5	356.	39.54
Item Mean	3.83	3.25	4.17	2.54	3.58	3.25	2.96	3.04	3.04	29.64	3.30

9-10 gp

S#	1	2	3	4	5	6	7	8	9	Gross Score	Item Score
25	6.5	6.0	6.5	3.0	3.0	1.0	3.0	7.0	3.0	39.0	4.33
26	1.5	3.0	2.0	2.0	4.0	5.5	5.0	6.0	6.5	35.5	3.94
27	1.0	5.0	1.0	1.0	5.0	1.0	3.0	1.0	1.0	19.0	2.11
28	6.5	3.0	1.0	1.0	1.0	1.0	4.0	1.0	3.0	21.5	2.39
29	6.0	4.0	4.0	4.0	5.5	3.0	4.0	6.5	1.0	38.0	4.22
30	1.0	1.0	4.0	5.5	5.0	1.0	5.0	6.5	3.0	32.0	3.56
31	6.5	4.0	2.0	6.0	5.5	6.5	1.0	7.0	6.5	45.0	5.00
32	2.0	3.0	2.0	1.0	3.0	2.0	3.0	5.0	6.0	27.0	3.00
33	7.0	6.5	6.5	6.5	3.0	6.0	3.0	6.5	7.0	52.0	5.78
34	1.0	3.0	1.0	6.5	3.5	1.0	3.0	1.0	1.0	21.0	2.33
35	1.0	3.0	1.0	1.0	3.5	1.0	6.5	6.5	5.0	28.5	3.17
36	1.0	3.0	1.0	1.0	3.0	1.0	3.0	1.0	5.5	19.5	2.17
Gross Score	41.0	44.5	32.0	38.5	45.0	30.0	43.5	55.0	48.5	378.	42.00
Item Mean	3.42	3.71	2.67	3.21	3.75	2.50	3.63	4.58	4.04	31.51	3.50

11-12 gp

S#											
37	1.0	4.5	1.0	1.0	4.5	1.0	6.5	1.0	5.0	25.5	2.83
38	7.0	6.5	2.0	1.0	3.0	2.0	4.0	4.0	3.5	33.0	3.67
39	2.0	4.0	6.0	6.5	4.0	2.0	6.5	1.0	1.0	33.0	3.67
40	6.5	3.0	2.0	6.5	7.0	3.0	7.0	3.0	1.5	39.5	4.39
41	6.5	7.0	1.0	1.0	1.0	4.0	6.5	2.0	3.0	32.0	3.56
42	1.0	3.5	1.0	1.0	6.5	1.0	3.5	6.0	3.5	27.0	3.00
43	5.0	4.0	2.0	3.0	4.0	6.0	4.0	3.0	6.5	37.5	4.17
44	1.0	3.0	1.0	1.0	3.0	1.0	5.5	6.5	1.0	23.0	2.56
45	6.5	7.0	6.5	6.0	6.0	7.0	6.0	6.5	6.5	58.0	6.44
46	1.0	4.0	5.0	7.0	7.0	7.0	6.5	6.5	6.5	50.5	5.61
47	2.0	6.0	1.0	1.0	3.0	6.0	2.0	1.0	7.0	29.0	3.22
48	1.0	4.0	6.5	1.0	4.0	1.0	5.0	1.0	1.0	24.5	2.72
Gross Score	40.5	56.5	35.0	36.0	53.0	41.0	63.0	41.5	46.0	412.5	45.84
Item Mean	3.38	4.71	2.92	3.00	4.42	3.42	5.25	3.46	3.83	34.39	3.82

Adult gp

S#	1	2	3	4	5	6	7	8	9	Gross Score	Item Score
49	5.0	2.0	6.0	1.5	1.5	6.0	1.5	7.0	4.5	35.0	3.89
50	4.0	5.0	6.0	4.0	4.0	4.5	4.5	2.0	2.0	36.0	4.00
51	1.0	5.0	1.0	6.0	1.0	1.0	1.0	1.0	1.0	18.0	2.00
52	3.0	1.5	1.0	1.5	1.5	3.0	1.5	1.5	1.0	15.5	1.72
53	6.5	4.5	7.0	7.0	5.0	4.5	3.5	5.0	7.0	50.0	5.56
54	1.0	4.0	3.0	1.0	1.0	1.0	5.0	2.0	1.0	19.0	2.11
55	1.0	3.5	5.5	3.5	3.5	4.0	5.5	1.0	2.0	29.5	3.28
56	4.0	4.5	2.5	6.0	7.0	5.0	7.0	6.5	5.5	48.0	5.83
57	4.0	2.0	4.0	1.0	3.0	4.0	2.0	7.0	2.0	29.0	3.22
58	5.0	7.0	7.0	5.5	4.0	3.0	6.0	5.0	7.0	49.5	5.50
59	2.0	5.5	7.0	2.5	3.0	7.0	2.0	7.0	7.0	43.0	4.78
60	1.0	2.0	1.0	1.0	4.0	1.0	0.0	3.0	2.0	15.0	1.67
61	3.5	3.0	2.0	1.0	3.0	1.0	3.0	1.0	2.5	20.0	2.22
62	6.5	1.5	2.0	2.0	3.0	7.0	2.0	2.0	1.5	27.5	3.06
63	3.0	2.0	1.0	1.5	1.0	1.0	2.0	1.5	5.0	18.0	2.00
64	5.0	2.0	2.0	1.0	2.5	2.0	2.0	3.0	3.0	22.5	2.50
65	4.0	1.0	2.5	1.5	1.5	1.5	7.0	1.5	2.5	23.0	2.56
66	7.0	7.0	7.0	4.0	7.0	5.0	6.0	7.0	7.0	57.0	6.39
67	7.0	4.5	7.5	7.0	7.0	7.0	7.0	7.0	4.5	55.5	6.17
68	2.5	3.0	2.0	2.0	1.0	3.0	2.0	7.0	3.0	25.5	2.83
69	2.0	3.5	5.0	2.0	2.0	4.0	4.0	6.0	7.0	35.5	3.94
70	5.5	2.0	3.5	2.0	2.5	2.0	1.5	5.5	5.5	30.0	3.33
71	6.5	3.0	1.5	6.5	3.0	1.5	4.5	1.5	1.5	29.5	3.28
72	7.0	3.5	7.0	7.0	3.0	7.0	7.0	7.0	5.0	53.5	5.94
73	1.5	3.5	4.0	1.0	3.5	3.0	4.0	4.0	5.0	29.5	3.27
74	1.0	0.0	1.0	3.0	1.5	1.0	2.0	1.0	3.0	13.5	1.50
75	7.0	4.0	3.0	2.0	2.0	4.0	2.0	3.0	3.0	30.0	3.33
76	7.0	2.5	7.0	7.0	5.0	7.0	3.5	6.0	7.0	52.0	5.78
77	7.0	7.0	3.5	5.0	6.0	7.0	7.0	7.0	4.5	54.0	6.00
78	2.0	3.0	3.0	2.0	4.5	4.0	2.0	2.0	2.0	24.5	2.72
79	5.0	3.0	6.0	0.0	3.0	3.0	4.0	5.0	6.0	35.0	3.89
80	2.0	2.5	6.0	3.0	4.0	2.0	4.0	2.0	7.0	32.5	3.61
81	1.5	4.5	6.0	3.0	2.0	7.0	3.0	7.0	3.0	37.0	4.11
82	7.0	6.0	7.0	7.0	4.0	7.0	5.5	7.0	7.0	57.5	6.39
83	1.0	2.0	3.0	1.5	1.5	1.5	1.0	3.0	0.0	14.5	1.61
84	6.0	2.0	2.0	4.0	2.0	7.0	2.0	7.0	5.5	37.5	4.17
85	5.0	5.0	7.0	7.0	3.0	7.0	6.0	7.0	4.0	51.0	5.67
86	7.0	5.5	7.0	7.0	5.5	6.0	3.5	4.0	4.5	50.0	5.56
Gross Score	157.0	133.0	159.5	127.5	122.5	152.5	137.5	163.0	151.5	1303.5	144.83
Item Mean	4.13	3.50	4.20	3.35	3.22	4.01	3.61	4.29	3.99	34.30	3.81

A P P E N D I X H (iv)

DISTRIBUTION OF SCORES ON EXPRESSIVE FACES TEST

APPENDIX H (iv)

DISTRIBUTION OF SCORES ON EXPRESSIVE FACES TEST

5-6 gp		7-8 gp		9-10 gp		11-12 gp		Adult gp			
S#	Score	S#	Score	S#	Score	S#	Score	S#	Score	S#	Score
1	12	13	8	25	8	37	7	49	5	68	4
2	14	14	9	26	9	38	7	50	5	69	4
3	7	15	13	27	10	39	7	51	6	70	4
4	14	16	12	28	10	40	4	52	6	71	4
5	9	17	13	29	6	41	5	53	0	72	0
6	13	18	12	30	9	42	7	54	6	73	3
7	13	19	8	31	5	43	5	55	4	74	5
8	11	20	9	32	9	44	7	56	2	75	4
9	9	21	8	33	5	45	2	57	5	76	2
10	8	22	8	34	10	46	3	58	0	77	2
11	9	23	9	35	9	47	7	59	2	78	5
12	8	24	12	36	11	48	8	60	6	79	5
								61	5	80	5
								62	6	81	4
								63	2	82	0
								64	6	83	8
								65	5	84	2
								66	0	85	2
								67	0	86	2

A P P E N D I X H (v)

DISTRIBUTION OF SCORES ON PORTRAIT SENSITIVITY TEST

APPENDIX H (v)

DISTRIBUTION OF SCORES ON PORTRAIT SENSITIVITY TEST

Note: a) A: Anger
C: Contempt
F: Fear
L: Love
S: Surprise

-- 5 Categories of Emotion --

b) The Portraits are separated into the categories of Happy (H) and Sad (Sa) for Group 5-6 only
c) Asterisk denotes correct categorization

5-6 gp	A	F	S	S	A	L	L	L	A	C	F	A	F	C	C	L	L	F	F	C	F	F	C	S
S#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Sa	Sa	H	Sa	H	H	H	H	SA	SA	SA	SA	SA	SA	SA	H	SA	SA	SA	H	SA	SA	SA	H
2	SA	SA	SA	SA	H	H	H	H	SA	SA	SA	SA	SA	SA	SA	H	H	SA	H	H	SA	SA	SA	H
3	Nil																							
4	SA	SA	SA	SA	H	H	H	H	SA	SA	SA	SA	SA	SA	SA	H	H	H	SA	H	H	SA	SA	SA
5	H	SA	SA	SA	H	H	H	H	H	SA	SA	SA	SA	SA	SA	H	H	H	SA	SA	SA	SA	SA	SA
6	SA	SA	SA	SA	H	H	H	H	SA	SA	SA	SA	SA	SA	SA	H	H	H	SA	H	nil	SA	SA	H
7	SA	SA	SA	SA	H	H	H	H	SA	SA	SA	SA	SA	SA	SA	H	H	H	SA	H	SA	SA	SA	H
8	SA	SA	SA	SA	H	H	H	H	SA	SA	SA	SA	SA	SA	SA	H	H	H	H	SA	SA	SA	SA	H
9	Nil																							
10	SA	SA	SA	SA	H	H	H	H	SA	SA	SA	SA	SA	SA	SA	H	H	H	H	H	H	SA	SA	H
11	SA	SA	SA	SA	H	H	H	H	SA	SA	SA	SA	SA	SA	SA	H	H	H	H	SA	SA	SA	SA	SA
12	SA	SA	SA	SA	H	H	H	H	SA	SA	SA	SA	SA	SA	SA	H	H	H	SA	SA	H	SA	SA	H
7-8 gp																								
13	A*	A	L	L	A*	L*	L*	L*	A*	F	A	A*	A	A	A	L*	L*	A	A	L	A	A	F	L
14	A*	F*	L	L	A*	L*	L*	L*	F	A	A	F	A	A	A	L*	L*	L	C	L	A	A	L	L
15	A*	A	C	C	C	L*	L*	L*	L	L	L	L	A	A	A	L*	A	A	A	A	A	F*	L	L
16	F	F*	F	F	F	L*	L*	L*	A*	F	F*	A*	F*	F	F	L*	L*	L	A	A	A	A	A	A

17	F	F*	L	L	F	L*	L*	L*	F	F	F*	A*	F*	A	A	F	L*	A	A	A	A	A	F	L
18	A*	L	A	C	A*	L*	L*	L*	A*	F	C	A*	L	L	L	C	C	A	A	A	A	A	L	L
19	A*	F*	A	S*	S	S	S	L*	A*	S	S	A*	A	A	L	L*	L*	A	A	F	A	F*	S	S*
20	F	F*	S*	S*	A*	L*	S	L*	F	F	A	F	A	A	A	L*	L*	A	A	A	A	A	A	S*
21	C	C	C	A	C	L*	L*	L*	C	F	A	C	C	C*	A	L*	L*	F*	F*	F	F*	F*	L	L
22	A*	F*	C	C	A*	S	S	S	F	F	F*	A*	S	S	A	L*	L*	F*	F*	S	F*	F*	F	S*
23	F	A	A	A	F	L*	L*	L*	F	F	A	C	C	C*	C*	L*	L*	A	A	A	A	A	A	S*
24	F	F*	S*	C*	C	F	A	F	C	C*	F*	S	F*	F	F	A	A	L	F*	L	L	F*	A	A
9-10 gp																								
25	A*	A	S*	S*	F	L*	L*	L*	F	C*	A	F	A	C*	C*	C	C	A	A	A	F*	A	C*	S*
26	F	F*	S*	S*	A*	L*	L*	L*	A*	C*	A	F	C	F	F	F	F	C	S	F	A	S	F	C
27	C	A	A	A	S	S	S	L*	A*	F	F*	A*	F*	S	L	L*	L*	L	A	S	A	A	A	A
28	F	A	A	F	F	L*	L*	L*	A*	C*	C	A*	F*	C*	S	S	L*	S	S	S	S	C	A	F
29	S	C	A	F	F	L*	L*	S	F	F	A	A*	F*	S	S	L*	L*	A	A	A	S	S	C*	L
30	A*	F*	F	F	A*	L*	L*	L*	S	S	F*	F	C	C*	L	L*	L*	F*	F*	F	A	L	L	L
31	S	S	L	L	F	A	A	L*	L	L	L	L	S	C*	C*	L*	L*	F*	F*	C*	F*	F*	S	S*
32	A*	F*	S*	C	A*	L*	L*	L*	C	S	A	F	A	S	A	L*	L*	A	A	S	A	A	L	L
33	L	L	F	S*	A*	L*	S	S	L	S	F*	F	A	A	S	C*	L*	L*	F*	F*	C*	F*	F*	C*	S*
34	F	A	S*	S*	C	L*	L*	L*	F	S	A	C	A	A	S	S	L*	L*	L	A	L	L	L	L	S*
35	A*	F*	-	F	C	L*	L*	L*	A*	S	S	F	A	S	L	L*	L*	A	C	C*	A	S	F	S*
36	S	S	F	L	L	F	S	S	F	F	A	L	L	L	C*	L*	L*	F*	F*	C*	F*	F*	C*	-
11-12 gp																								
37	A*	F*	S*	L	A*	L*	L*	L*	A*	C*	F*	L	L	S	L	S	S	L	A	L	A	A	L	S*
38	F	S	A	L	F	S	L*	S	A*	C*	F*	C	A	L	S	L*	L*	F*	A	C*	S	A	S	C
39	F	A	S*	S*	S	S	L*	S	F	C*	A	F	A	C*	C*	L*	L*	S	A	C*	A	L	C*	S*
40	F	A	S*	S*	S	L*	L*	L*	C	C*	S	L	L	C*	C*	L*	L*	L	L	C*	A	S	C*	S*
41	A*	F*	L	C	A*	L*	L*	L*	F	S	F*	A*	S	L	S	F	S	F*	F*	L	F*	F*	L	L
42	S	S	A	C	F	L*	L*	L*	F	A	A	F	L	S	C*	L*	L*	F*	F*	S	F*	F*	-	C
43	L	L	L	L	L	L*	S	L*	A*	C*	F*	A*	F*	C*	L	L*	S	L	L	L	A	A	C*	S*
44	A*	F*	L	A	A*	L*	L*	L*	F	F	A	C	S	L	C*	L*	L*	S	A	L	S	S	S	L
45	S	S	F	L	C	L*	L*	L*	A*	C*	F*	A*	F*	C*	C*	L*	L*	E*	C	E	C	C	C*	C
46	A*	F*	S*	S*	A*	L*	L*	L*	A*	C*	S	F	S	C*	C*	L*	L*	C	C	C*	A	A	C*	S*
47	F	L	C	C	S	L*	L*	L*	F	L	A	S	S	S	S	L*	L*	F*	F*	C*	F*	S	C*	S*
48	A*	F*	C	C	F	L*	L*	L*	L	S	L	L	L	L	S	L*	L*	L	L	F	A	A	C*	S*

Adult gp

49	F	A	L	L	F	L*	L*	L*	A*	C*	F*	L	S	S	S	S	S	A	A	S	L	L	C*	S*
50	A*	F*	S*	S*	F	S	L*	S	A*	S	L	L	A	S	L	L*	L*	S	L	A	C	A	C*	S*
51	A*	F*	S*	S*	S	S	L*	L*	A*	C*	A	F	A	C*	C*	L*	L*	A	A	A	C	A	F	A
52	F	L	L	L	F	L*	L*	L*	F	-	-	A*	-	S	S	L*	L*	A	A	C*	A	-	C*	S*
53	A*	F*	S*	S*	A*	L*	L*	L*	A*	C*	S	A*	F*	C*	C*	L*	L*	F*	F*	C*	A	-	C	-
54	S	F*	S*	S*	A*	L*	L*	L*	L	C*	F*	L	L	C*	C*	S	S	A	L	C*	S	S	C*	S*
55	F	L	L	L	F	L*	L*	L*	A*	C*	F*	A*	F*	C*	C*	L*	L*	F*	F*	A	F*	F*	L	L
56	A*	F*	L	L	A*	L*	L*	L*	A*	C*	F*	A*	F*	C*	C*	L*	L*	F*	F*	C*	F*	F*	C*	S*
57	A*	F*	S*	L	A*	L*	L*	L*	A*	C*	A	L	C	C*	C*	L*	L*	S	S	A	A	A	C*	S*
58	A*	F*	S*	S*	S	L*	L*	L*	A*	C*	F*	A*	A	A	A	L*	L*	F*	F*	C*	A	C	C*	S*
59	S	S	S*	S*	A*	L*	L*	L*	A*	C*	F*	A*	F*	C*	C*	L*	L*	E	A	C*	F*	F*	C*	S*
60	A*	F*	S*	A	F	L*	L*	L*	A*	A	A	F	C	C*	C*	L*	L*	C	C	F	A	A	L	L
61	L	S	S*	L	L	L*	L*	L*	F	C*	A	A*	C	C*	L	L*	L*	A	A	C*	C	F*	V	-
62	A*	F*	S*	S*	C	L*	L*	L*	A*	S	S	L	L	S	S	L*	L*	A	A	C*	L	S	C*	L
63	A*	F*	L	L	F	L*	L*	L*	S	L	F*	F	F*	F	F	L*	L*	F*	F*	C*	F*	F*	C*	S*
64	L	L	A	C	F	L*	S	L*	A*	C*	F*	A*	F*	C*	L	L*	L*	A	A	C*	A	A	A	A
65	A*	F*	S*	S*	A*	S	S	S	L	S	A	F	C	L	L	S	L*	F*	F*	C*	A	C	A	S*
66	A*	F*	S*	L	A*	L*	L*	L*	A*	C*	A	A*	F*	C*	C*	L*	L*	S	S	C*	F*	F*	C*	-
67	-	F*	S*	S*	A*	L*	L*	L*	A*	C*	F*	A*	F*	C*	C*	L*	L*	F*	F*	C*	S	L	S	C
68	S	S	S*	S*	L	L*	L*	L*	C	L	A	F	S	S	L	L*	L*	F*	F*	C*	F*	F*	C*	S*
69	C	F*	L	S*	A*	L*	L*	L*	L	C*	F*	A*	F*	L	C*	L*	F	S	L	A	S	L	L	
70	F	L	L	F	L	L*	L*	L*	A*	C*	L	A*	F*	C*	C*	L*	L*	S	S	C*	F*	S	L	L
71	C	A	S*	S*	A*	L*	L*	S	L	L	L	L	L	C*	C*	L*	L*	S	L	C*	F*	A	C*	S*
72	A*	F*	S*	S*	A*	L*	L*	L*	S	C*	F*	F	A	C*	C*	L*	L*	S	A	C*	A	L	C*	S*
73	A*	A	A	S*	F	L*	L*	L*	F	C*	F*	F	A	A	A	L*	L*	F*	F*	C*	F*	F*	C*	L
74	F	A	A	A	L	L*	L*	S	L	L	A	S	-	C*	C*	L*	L*	A	A	C*	A	C	L	C
75	S	L	L	L	A*	L*	L*	L*	A*	A	A	F	F*	C*	C*	L*	L*	A	F*	C*	F*	F*	F	S*
76	A*	F*	S*	S*	L	L*	L*	L*	A*	C*	A	A*	F*	C*	C*	L*	L*	F*	F*	C*	S	S	C*	L
77	L	F*	S*	L	C	L*	L*	L*	A*	A	F*	A*	F*	C*	S	L*	L*	F*	F*	S	F*	F*	C*	S*
78	L	S	L	A	F	L*	L*	L*	A*	C*	F*	A*	A	C*	C*	L*	L*	A	A	C*	S	S	C*	F
79	A*	F*	S*	L	A*	L*	S	L*	A*	C*	F*	L	L	S	C*	L*	S	F*	A	C*	A	A	A	A
80	A*	F*	L	F	L	L*	S	L*	L	C*	F*	A*	F*	C*	L	L*	L*	L	A	C*	L	S	C*	L
81	S	F*	S*	L	L	S	S	L*	A*	C*	F*	A*	F*	C*	C*	S	L*	F*	F*	C*	L	F	A	A
82	-	F*	S*	S*	A*	L*	L*	L*	A*	C*	F*	A*	F*	C*	L	L*	L*	F*	F*	L	F*	F*	-	S*
83	A*	F*	A	A	F	L*	L*	L*	F	A	A	S	F*	S	A	L*	L*	L	S	S	A	F*	F	L
84	F	L	S*	S*	A*	L*	L*	L*	L	C*	F*	A*	A	C*	C*	L*	L*	F*	F*	C*	F*	F*	L	A
85	A*	F*	L	L	A*	A	F	A	A*	C*	F*	A*	F*	C*	C*	A	S	F*	F*	C*	F*	F*	C*	A
86	A*	F*	S*	S*	A*	A	L	S	A*	C*	F*	S	L	C*	A	C	L*	F*	L	C*	F*	F*	A	A

A P P E N D I X H (vi)

DISTRIBUTION OF SCORES (AVERAGED OVER JUDGES RATINGS) ON INTERVIEW SITUATION

APPENDIX H (vi)

DISTRIBUTION OF SCORES (AVERAGED OVER JUDGES RATINGS) ON INTERVIEW SITUATION

5-6 gp		7-8 gp		9-10 gp		11-12 gp		Adult gp			
S#	Score	S#	Score	S#	Score	S#	Score	S#	Score	S#	Score
1	4	13	6	25	5.5	37	2.5	49	3	68	4
2	5	14	5.5	26	4.5	38	4	50	6.5	69	4
3	6.5	15	4	27	4	39	3.5	51	3	70	4
4	5	16	5.5	28	3.5	40	5.5	52	5.5	71	3
5	5.5	17	4	29	5.5	41	2	53	6.5	72	5
6	5	18	4.5	30	4	42	4	54	4	73	4
7	5	19	5.5	31	5	43	3	55	4	74	2.5
8	5.5	20	5.5	32	6	44	4.5	56	5	75	5
9	6.5	21	6	33	6	45	3.5	57	4	76	5
10	5.5	22	6	34	5	46	7	58	3	77	7
11	5.5	23	5.5	35	5	47	4.5	59	5	78	4.5
12	6.5	24	5.5	36	4.5	48	5	60	4	79	4.5
								61	3	80	3
								62	4	81	4
								63	4	82	3.5
								64	3	83	1.5
								65	3	84	4
								66	5.5	85	5.5
								67	5	86	4

A P P E N D I X I

DISTRIBUTION OF SCORES FOR PROGRAMMED KINESTHETIC BODY-FLEXIBILITY TASKS FOR THE 5-6 gp AND THE Adult gp

APPENDIX I

DISTRIBUTION OF SCORES FOR PROGRAMMED KINESTHETIC BODY-FLEXIBILITY TASKS FOR THE 5-6 gp AND THE Adult gp

Extinction Trials

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3	x	x	x	x	x	x	x	x	x	x	x	x	x							
3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					
3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					
3	x	x	x	x	x	x	x	x	x	x	x	x	x							
6	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
6	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
6	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
6	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
6	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					
10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					
10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
15	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
15	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
15	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
15	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
3	x	x	x	x	x	x														
3	x	x	x	x	x	x														
3	x	x	x	x	x	x														
3	x	x	x	x	x	x														
3	x	x	x	x	x	x														
6	x	x	x	x	x	x	x	x	x	x										
6	x	x	x	x	x	x	x	x	x											
6	x	x	x	x	x	x	x													
6	x	x	x	x	x	x	x													
6	x	x	x	x	x	x														
10	x	x	x	x	x	x	x	x	x	x	x	x								
10	x	x	x	x	x	x	x	x	x	x	x	x	x							
10	x	x	x	x	x	x	x	x	x	x	x									
10	x	x	x	x	x	x	x	x	x	x	x	x								
10	x	x	x	x	x	x	x	x	x	x	x	x								
15	x	x	x	x	x	x	x	x	x	x	x	x								
15	x	x	x	x	x	x	x	x	x	x	x	x	x							
15	x	x	x	x	x	x	x	x	x	x	x									
15	x	x	x	x	x	x	x	x	x	x	x									
15	x	x	x	x	x	x	x	x	x	x	x	x								