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AEROMEDICAL REVIEWS

COPING AND DEVELOPMENTAL THEORY:
APPLICABILITY TO SELECTIVE STUDY
OF NORMAL MEN

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**COPING AND DEVELOPMENTAL THEORY: APPLICABILITY TO
SELECTIVE STUDY OF NORMAL MEN**

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Review 1-65

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COPING AND DEVELOPMENTAL THEORY: APPLICABILITY TO SELECTIVE STUDY OF NORMAL MEN

INTRODUCTION

This report describes a practical way to identify adaptive modes of behavior. The subject is an important one to the Air Force because of routine personnel evaluations for reliability, aptitude, leadership, job training, and sensoriperceptual conditioning. In recent years specialized missions have placed greater demands on adequate selection procedures. An improved theoretic basis for choosing the best qualified from among well-functioning individuals is required. Concepts widely used in child psychiatry and based on several converging lines of research can be applied to this problem.

THEORETIC IDEAS

Styles of adaptation vary from person to person, yet derive from a sequence of development that is universal. Adults cope with new situations by psychologically putting them in the context of ones already mastered. They use coping devices which originate in childhood, then elaborate through life. Familiarity with the growth process that determines the development of coping devices facilitates meaningful predictions of behavior.

There are certain terms that will be used consistently throughout this paper. These are coping, adaptation, mastery, coping strategy, coping devices, and psychologic defenses. Definitions for them were derived from Murphey's book, *The Widening World of Childhood* (1). *Coping* refers to behavioral steps taken to come to grips with a challenge or task and is considered in terms of both

coping strategy and *coping devices*. *Coping strategy* describes an overall approach to a problem. *Coping devices* are more minute elements of behavior, the building blocks which construct total activity.

Adaptation is the adjustment of an organism to its environment. Successful coping results in adaptation. A more precise behavioral term for adaptation is *mastery*. Coping must be considered in relationship to the task to be mastered. Tasks to be mastered may include emotional, interpersonal, or physical aspects.

An example from everyday life illustrates how these definitions are used. A man coming late to work could be presented with the emotional problem of overcoming feelings of shame, the physical consideration of finding a place to park, and the interpersonal task of dealing with an irritated employer. Among the various coping strategies he could use to master the situation would be direct action and avoidance. Each represents a style of behavior. He could also use several possible coping devices, such as talking over the problem with the employer or attempting to joke about it.

Coping is not synonymous with *psychologic defenses*, which are an implied rather than an observed activity. Coping is overt behavior, which can be observed and measured.

REVIEW OF LITERATURE

Modern theory concerning psychologic growth may be summarized in four concepts: (1) Methods for dealing with life are developmentally derived. (2) Emotional needs as well as events shape development. (3) Development evolves through relationships with other people. (4) The organism has both inborn and social guidelines for a specific developmental sequence.

The first concept is that a person's methods of adaptation (coping) are layered during development from simple to complex with simpler modes of behavior integrally shaping and coloring

the more complex. For example, an infant babbles in a stereotyped manner. As an adult, he has complex verbal abilities. His verbal ability was derived from this original babbling.

Piaget (2) and associates extended the understanding of this developmental process when they traced the process by which early "sensory motor" thinking evolves to logic. According to Piaget, events in the environment (aliment) are "assimilated." Events are made part of the subject's psychology through perception and use. Concrete manipulations of physical objects grow into and are inseparable from verbal intelligence.

At the biological level assimilation refers to the incorporation of concrete substances into an organic structure (an organ system); at the primitive psychological level assimilation refers to the tendency of the organism to incorporate sensory and motor components of a behavior into the reflex schema they have activated; and at later developmental stages it refers to the tendency of the mental apparatus to incorporate external ideas and the products of mental activity into a complex system of thought schemata (3, pp. 23 - 25).

Put in Piaget's terms, "the organism gives the impression that it seeks to renew contact with novelties precisely because it has had experience with them. ... (This process) is called reproductive assimilation. Its function is to stabilize a newly acquired behavior by ... (repetition)" (3, p. 25). An extension of this position is to view adult learning as part of a developmental process rather than a series of isolated events.

Hebb (4), working with experimental animals, also found that methods for dealing with life are developmentally derived. Comparing the problem-solving ability of cage-reared rats to pet-reared rats, he discovered that early experience had a permanent effect at maturity which further learning did not erase. His conclusion can be applied as a psychobiologic substrate for developmental theory:

Learning ... consists of a lasting change of facilitations between the activities of specific neural structures. The change results when two structures which have sufficient anatomical connections are active at the same

time. The first (immature) learning establishes an organization of individual transmission units into an assembly. But later learning is a change of facilitation between organized systems, a changed interaction between one complex of assembly actions and another . . . (4).

Thus "learning" may be construed to be a developmental process that adds to the specificity of coping.

In psychoanalytic theory, coping devices may be included as functions of the concept "ego." Hartman (5) stressed that development of the integrative apparatus (ego) proceeds by natural progression as well as a result of intrapsychic conflicts. Put in his words: "Ego development is a differentiation in which . . . primitive regulating factors are increasingly replaced or supplemented by more effective regulating factors. Differentiation occurs through the mastery of new demands and tasks by creating new (psychological) apparatus, but mainly by taking over on a higher level functions originally carried out by more primitive regulations" (5).

Other theoretic approaches using different methodologic techniques arrive at similar conclusions and therefore lend validity to the formulation of spiral psychologic development. Luria (6), working in the Pavlovian tradition with an apparatus measuring finger movements, concluded that human behavior

... proceeds along the paths of dominating the primitive (reflex) laws rather than along simple repetitions of them in their new stages. . . . The genesis of organized human behavior is through development and inclusion of all the new regulating systems which overcome primitive forms of behavior and transfer them to that which is new and more systematized organization. . . . These new functions permeate the whole activity and structure of behavior so that we can find them literally in every movement of the fingers.

Harry Stack Sullivan had a similar notion. In his "Interpersonal Theory of Psychiatry" he postulates that for maturation of any human capacity there must be appropriate and useful experience (7). "Genetic givens" fix the limits of developmental possibilities. Realization of an ability creates a need to repeat it.

These theoretic approaches contain within their structure the concept of development as a repetitive spiraling process by which early global stereotyped behavior becomes discrete and goal-oriented.

The second concept is concerned with the affective components essential for the normal unfolding of the developmental process. The growth of coping technics integrally involves emotional needs and feelings. Wolff states that "far beyond the reflex stage... (inborn needs) play a significant role in the construction of stable adaptive mechanisms. These forces are potent factors in the organization of reality experiences and have a long range influence on all of a child's actions and thought patterns" (8, p. 171).

Experimental psychophysiology adds data which confirm the importance of emotions to growth. Relationships between emotional responses and stimulation of the paleocortex and hypothalamus have been shown. According to Olds (8), these two cerebral structures also function in learning. He presents the following evidence:

Specific paleocortical and hypothalamic structures ... are involved in the selection of learned behaviors (This conclusion) is indicated by the extremely large number of places within them where electrical stimulation can serve as positive reinforcement to increase the frequency of Skinner box responses and complicated maze behavior chains.

This evidence serves as a psychobiologic explanation for the effects emotions have on development of coping styles. Modern Pavlovians such as Luria use different semantics but also consider affects an integral part of behavior.

Piaget's principles of assimilation and accommodation are also applicable to effects of emotions on growth. An organism not only incorporates outside stimuli but changes in response to them (9). Thus, affects not only influence choice of coping technics but also are an integral part of them. For instance, the technic of provocatively seeking emotional closeness could grow out of needs for closeness which were frustrated, causing anger. Anger would then be built into the adult behavior.

The third concept concerning development is that the growth of adaptive modes of behavior depends on transactions with other people. Most psychiatric theories stress the influence of interpersonal relationships on growth. Interpersonal relationships during childhood are important determinants of the presence of abnormal coping technics. They also determine the quality of normal coping technics. Children "assimilate" elements of relationships which can then be observed in their adult behavior. Longitudinal studies of humans indicate that coping devices develop incompletely when parents are absent (10). Similar naturalistic observations have been made of animal behavior. In an attempt to produce a colony of disease-free animals for research programs, Harlow (11) raised them in a sterile, isolated environment. He was surprised to find the animals not only sturdy and disease-free, but also without the usual repertoire of responses for defense from assault, play with peers, and sexual behavior. His conclusion was that there is a critical period somewhere between the third and sixth month of life during which deprivation of the company of its mother and peers irreversibly blights the animal's capacity for social adjustment. These findings lend support to the importance of interpersonal transactions in personality growth.

The first three concepts may be summarized in the following manner: Normal coping devices evolve from simple global technics to more complex discrete forms. Development occurs by means of an expanding spiral of transactions with the environment through which complex coping technics incorporate simpler ones. The most important elements of these transactions are the individual's affective needs and interpersonal relationships.

The fourth concept postulates that an organism has inborn and social guidelines. There are species-unique, genetically determined series of anatomic and physiologic stages that provide a scaffold on which psychologic development is built. Freud (12) described these stages in terms of erogenous body zones that interact with the environment. These were the oral, anal, phallic, and genital stages of psychosexual development. Sullivan (13) described them in terms of interpersonal relationships. His stages

were infancy, childhood, the juvenile era, preadolescence, early adolescence, and late adolescence.

Recent work has expanded knowledge of developmental phases. Bowlby (14) suggests that an important initial determinant is the infant's "attachment" to its mother by means of inborn patterns of behavior. He describes five inborn patterns that humans share with other animals. These are sucking, clinging, following, crying, and smiling. These inborn activities facilitate an increasingly involved relationship with the mother within which the infant grows. Later in life when behavior is much more complex, this unique primary relationship with its concomitant psychologic progress is difficult to establish.

Attachment behavior has also been described in simpler animals (15). Duck imprinting illustrates how important timing can be. Birds exposed to the sight of man for a few minutes after hatching henceforth follow man rather than their mothers. Imprinting is only partially reversible by new experiences. Attachment to alien species has also been facilitated in mammals (16). Extrapolation suggests similar mechanisms in man. The evidence from cross species and direct observations thus point to a specific initial "attachment" stage for human development.

Later anatomic and physiologic events also change the relationship of the organism to the environment and color internal perceptions. Examples of such events are eruption of the teeth, completion of nerve myelination, growth of coordination, increased physical stature, and puberty. During each phase psychologic growth is achieved which would be impossible to accomplish before, and difficult after, the physiologic event in question.

Erikson (17) integrated the spiraling nature of development with the importance of internal needs, interpersonal relationships, and stages. He described stages punctuated by "psychosocial crises." These crises are trust vs. mistrust, autonomy vs. shame, initiative vs. guilt, industry vs. inferiority, identity vs. identity diffusion, intimacy vs. isolation, generativity vs. self-absorption, and integrity vs. despair. Concepts about development of coping

devices fit into Erikson's framework and facilitate systematic personality studies. Table I is a chart adapted from Erikson (18). His term "psychosocial crisis" has been replaced by the term "developmental task." This emphasizes that each stage has a natural mode of behavior intrinsic to current emotional needs and interpersonal relationships through which psychologic progress is achieved. The headings for each row in table I are major determinants of behavior. The column headings list six consecutive developmental age groups. These age groups represent specific but not sharply delineated stages. A physiologic or anatomic event heralds each stage. For example, at six months teeth begin to appear. At a year and a half the child is locomoting. By age four the individual is well-coordinated. Thirteen ushers in puberty and adult life.

Reference to table I shows how the information summarized in it is used to formulate predictions of behavior. Columns one and two indicate that in the first six months of life "receiving and giving" is the major natural mode of behavior through which a mother satisfies her infant's physical needs. An example of an adult coping technic evolving from this early mode of behavior is helping others. By the age of six months physical and psychologic development normally result in needs for more affective interpersonal closeness. Mothers meet these needs by means of active "give and take," such as the game of peek-a-boo. An example of an adult technic that can be traced back to the second stage of "give and take" is "joking around." Row five gives examples of adult coping technics that may evolve. The specific technics for any given individual depends on the actions and attitudes of his parents, intensity of affective needs, and events that occur during various stages of development. Coping technics learned in childhood are progressively elaborated and used in similar contexts later in life. It is therefore necessary that predictions of adult behavior integrate information about the task under study with a history of emotional needs in relationship with significant people during developmental phases.

Table I is most useful in making differentiations among well-integrated individuals. By definition such people have "strong

egos." Measures of ego strength have been used in such tasks as astronaut selection (19). Row 7 of table I lists ego functions. They are included in the chart to show how they differ from concepts of coping and development. Knowledge of coping devices is a supplement to measures of ego strength. Both grow progressively through life if built on firm foundations.

Table II illustrates the development of coping technics of people who have had serious developmental difficulties. This chart should be contrasted with that of the development of normal technics shown in table I. Table II demonstrates how overall infantile modes of behavior can persist and become associated with coping devices that are maladaptive except for the specific situation in which they originally developed. Because of the complexity of development, well-integrated people may have occasional recourse to similar coping devices; therefore, these coping devices must be included in all evaluations. Despite some use of less adaptive coping devices, well-integrated adults will not have the psychologic (ego) arrests listed in row 6 of table II.

Tables I and II refer to habitual personality patterns and do not deal with reactive disorders such as neurosis and psychosis. A more thorough discussion of personality disorders based on similar theoretic grounds is contained in a monograph by Reiner and Kaufman (20).

The items in both tables are provisional attempts to provide flesh for the skeleton of developmental theory. A research example will tie together concepts of coping and developmental process and demonstrate their operational applicability.

EXAMPLE OF RESEARCH

An evaluation of coping devices was made on four airmen in order to estimate their suitability for an altitude chamber ride—six weeks in duration, four weeks at 27,000 feet on 100% oxygen. The vehicle used in the study was the School of Aerospace Medicine's four-man space cabin simulator. Descriptions of a

TABLE I
Ages of developmental stages

Determinants of childhood behavior	0 to 6 mo.	6 to 18 mo.	18 mo. to 4 yr.	4 to 6 yr.	6 to 13 yr.	13 to 17 yr.
1. Developmental task	Achieving ability to trust	Achieving ability to trust	Achieving ability for self-control	Achieving ability to take initiatives	Learning social skills	Achieving sense of self-identity
2. Person with whom development progresses	Maternal person	Maternal person	Parental person	Differentiated maternal and parental persons and siblings	Family members, teachers, and schoolmates	People in the world at large
3. Chief emotional need that influences development	Physical needs (feeding, breathing, etc.)	Physical closeness to the maternal person	Approval from the parental person (acceptance)	Feeling competent in relation to family and peers	Feelings of growth	Feeling competent in relation to world
4. Mode of behavior that originates at this time	Receiving and giving	Active give and take	Control over affects, muscles, and other people	Creative self-assertion	Formal learning	Independent action

TABLE I (cont.)

	0 to 6 mo.	6 to 18 mo.	18 mo. to 4 yr.	4 to 6 yr.	6 to 13 yr.	13 to 17 yr.
Determinants of childhood behavior						
5. Example of a coping technic begun at this time and seen in adults	Helping others	Joking around	Mechanical skills	Talking things through	Reading	Productive original work
6. Psychologic defenses begun at this time	Denial Repression	Projection Introjection	Compulsive defenses Isolation of affects	Fantasy Substitution Sublimation		
7. Other psychologic capacities that originate and develop (ego functions)	Ability for interpersonal relationships Integrative and synthetic abilities Control over impulses Reality concepts			Primitive conscience		"Mature" conscience
8. Type of thinking	Sensory — motor		Magical	Logical Concrete		Logical Abstract

TABLE II
Age at which there was developmental difficulty

Description of adult behavior	0 to 6 mo.	6 to 18 mo.	18 mo. to 4 yr.	4 to 6 yr.	6 to 13 yr.	13 to 17 yr.
1. Mode of behavior observed in adult	Passive-receptive (begging)	Passive-aggressive (snatching)	Aggressively controlling or withdrawn	Stereotyped and repetitive or inhibited	Unproductive (still learning)	Searching
2. Person with whom behavior is associated	Maternal person	Maternal person	Controlling person	Seductive or competitive person	Teaching person	Model person
3. Source of anxiety	Hypochondriacal (psycho-physiologic)	Alienation or loss of the object of affection	Conflict over loss of control	Conflict over winning or losing	Being left to learn on one's own	Not having secure answers
4. Emotion state commonly accompanying anxiety	Fear	Depression	Shame	Guilt	Anger	Confusion
5. Example of coping technic seen in adults with a difficult past	Ignoring dangerous situations	Provocatively seeking physical contact	Attempts to control and manipulate others	Bullying behavior	Following blindly	Doubt-ridden work and play

TABLE II (cont.)

Description of adult behavior	0 to 6 mo.	6 to 18 mo.	18 mo. to 4 yr.	4 to 6 yr.	6 to 13 yr.	13 to 17 yr.
	6. Other psychologic capacities that fail to develop, the observation of which allows prediction of poor performance	<p>Poor ability to relate warmly</p> <p>Primitive defenses</p> <p>Poor impulse control</p> <p>Thinking disorders</p> <p>Poor integration</p> <p>Poor reality testing</p> <p>No conscience</p> <p>No sense of identity</p>	<p>Distant relationships</p> <p>Inflexible defenses</p> <p>Mixed impulse control</p> <p>Conscience based on shame</p> <p>Fair integration</p> <p>Concrete identity</p> <p>Magical thinking</p>	<p>Relationships closer but unrealistic</p> <p>Primitive conscience</p> <p>Poor sexual identity</p> <p>Concrete thinking</p>	<p>Unlearned social skills</p>	

TABLE III
Rating scale for coping devices

	Excep- tionally	Very well	Average	Not very well	Not at all
A. He copes with a desire for this dependent closeness and affects related to it by:					
8. Seeking physical contact	—	—	—	—	—
9. Emotionally distancing himself from others	—	—	—	—	—

comparable situation and simulator are contained in another publication (21). The evaluation of Airman A, one of the volunteers, is illustrated below. (Only one of the evaluations is included in this paper for reasons of space and because its emphasis is theoretic. Results for the other three airmen were comparable.)

Airman A was an aggressive, direct and self-confident individual who thought the chief task of the flight was to harmoniously work with the other three subjects. He considered the physical discomfort, danger, and confinement as secondary. His usual way of coping with stresses was through direct action: mechanical, verbal or physical. He made use of every opportunity to learn details of the experiment and then desired to discuss them with the others. In the past, working and talking over things with his father and three brothers had been daily events in the family store. In the chamber when a more taciturn individual refused discussions, he would turn quietly away in anger, but return to handle the situation constructively. This was a pattern he had used with a cerebral palsied brother and still earlier with his hardworking mother.

The initial evaluation before the altitude-chamber run utilized a tape-recorder, associative interview. Airman A was encouraged to talk about the adaptive technics he had used to master past life situations. The tape also demonstrated how he handled the interview itself. Three psychiatrists independently rated the degree to which he utilized the various items from a list of coping mechanisms (see appendix I). Each device was rated on a five-point scale. An example of the rating scale is presented in table III.

The three independent ratings for each item were averaged and the range between them calculated. For example, if the item shown above had been rated 2, 3, and 4 by each of the judges, the average would be 3 and the range 3. If all three judges rated it 3, the average would be 3 and range 1.

The results for each category were then dichotomized into those items rated above 2.5 and those below 1.3. Thus, only the coping devices rated most and least likely are reported.

In addition, during the month and a half duration of this experiment many direct observations were made of the subjects in the chamber. Diaries were kept by the subjects. After removal from the chamber each subject was interviewed regarding how he or the others handled situations that arose. Information from these three sources was used to estimate how accurate the predictions had been.

The results of Airman A's evaluation are presented in tables IV-VIII. In each table the first column lists the coping devices rated highest and lowest. The next two columns indicate the average score and range. The fourth column indicates by a plus or minus mark whether the predicted behavior actually occurred. N/A signifies that information was found not to be applicable to the situation. Under each table are two paragraphs: one discusses how the ratings were interpreted for prediction; the other, how predictive they actually were.

TABLE IV

Subject's coping devices for issues of closeness and affects associated with them

Coping device	Predictive rating		Observed behavior
	Average	Range	
I. Devices most likely used:			
A-6 Helping the object of his desires (role reversal)	3	3	+
A-1 Constructively (actively) seeking emotional closeness	2.7	2	++
A-4 Appropriate substitution of the object of his desires	2.5	2	+
II. Devices least likely used:			
A-7 Repression, suppression, or denial of needs for closeness	1	2	-
A-8 Projection of desires for closeness	0.7	2	-
A-3 Provocatively seeking emotional closeness	0.7	2	-
A-10 Angry denial or depression (expecting nothing)	0.3	2	-
A-9 Physically or emotionally distancing himself	0.3	2	-

Prediction: Implications for a close living situation were that he could be expected to make a friendly, nondepressive adjustment regarding dependency. Dependency on the part of his companions would not antagonize him.

Retrospective evaluation: The others subsequently reported that Airman A was helpful, "kept up our ambition," and "always wanted to talk." One subject who was antagonized by desires for closeness said that Airman A sensed this and let him alone. The followup indicates that ratings were useful predictors of behavior in a close living situation.

TABLE V

Subject's coping devices for autonomy and the emotions associated with them

Coping device	Predictive rating		Observed behavior
	Average	Range	
I. Devices most likely used:			
B-11 Being as appropriately physically active as possible	3	1	++
B-12 Constructive mechanical work or play	3	3	++
B-21 Freely expressing ideas and affects	3	1	+
II. Devices least likely used:			
B-13 Inhibiting or withdrawing from physical activity or work	0.3	2	-
B-18 Isolation or shame over aggressive feelings or affects	0.6	3	-
B-19 Denial, repression, or suppression of desires for self-assertion	0.7	2	-
B-15 Impulsive outbursts of activity	1	1	-
B-14 Compulsive attention to details			

Prediction: Implications for a situation with limited physical outlets were that he would feel frustrated but would seek constructive interpersonal outlets rather than turn to maladaptive behavior.

Retrospective evaluation: Airman A was constructively active except when insistent over neatness. Ratings underestimated use of these compulsive devices but were generally predictive.

TABLE VI

Subject's coping devices for masculine strivings (taking initiatives) and associated emotions

Coping device	Predictive rating		Observed behavior
	Average	Range	
I. Devices most likely used:			
C-23 Direct self-confident assertion	2.7	2	++
C-41 Talking things through with the other person	2.7	3	+
C-26 Attempting to take over at the other person's expense	2.7	2	+
C-29 Overestimation of capacities (bragging)	2.7	2	+
C-42 Retreat to peer group activities	2.7	2	++
II. Devices least likely used:			
C-36 Assuming a feminine role	0.3	2	-
C-30 Self-depreciation (appeals for sympathy)	0.7	2	-
C-27 Compulsive self-control	0.7	2	-
C-31 Projection of competitive feelings and anger at other men	0.7	2	±
C-28 Clowning or acting childish	1	2	-
C-32 Denial, repression, or suppression of competitive feelings	1	2	-
C-43 Bullying behavior	1	1	-
C-35 Substituting female for male companionship	1	3	N/A
C-25 Using passive-aggressive technics	1	1	-

Prediction: From these ratings we predicted a conflict should one of the monitors or other subjects have a need to dominate. Airman A's adaptation would be through talking things over and group activity rather than bullying or retreating.

Retrospective evaluation: The subject did not come into disruptive conflict with those in the chamber even when teased about a nocturnal emission. Minimal personality conflicts were openly confronted and talked through. Airman A's position as a natural group spokesman antagonized those in authority outside the chamber. This personality conflict was mutual. When one of the monitors read magazines on duty, Airman A angrily asked him to attend to work. As predicted, he had more trouble with authoritative than peer figures but was able to iron out problems.

TABLE VII

Subject's coping devices for problems and affects associated with peer groups (the issue of industriousness)

Coping device	Predictive rating		Observed behavior
	Average	Range	
I. Devices most likely used:			
D-52 Assuming a protective role toward the others	3.3	2	+
D-48 Sharing mechanical activities or hobbies	3.7	2	++
D-50 Talking together	2.5	2	++
II. Devices least likely used:			
D-53 Taking a passive position (passive-aggressive behavior)	0.6	2	-

Prediction: Airman A was expected to cope with companions by means of shared mechanical and group activities. Tendencies to assume a protective role would either soothe or antagonize others but not leave them neutral. If the effect was disruptive, Airman A could be expected to talk things through but not become destructive.

Retrospective evaluation: Airman A got along well with the others by holding prolonged discussions on mechanics and looking out for the group. "We were a smooth, well-oiled team." The ratings were highly predictive of peer group behavior.

TABLE VIII
Subject's coping devices for sexual impulses

Coping device	Predictive rating		Observed behavior
	Average	Range	
I. Devices most likely used:			
E-65 Taking a protective role with women	3.5	2	N/A
II. Devices least likely used:			
E-64 Guilt, depression, or hostility to females	0.8	2	—
E-58 Asceticism	0.8	2	—
E-57 Avoiding females	0.8	2	N/A
E-56 Premature experimentation	0.7	2	N/A
E-63 Denial, repression, or suppression of needs	0.7	2	N/A
E-62 Strongly moralistic or idealistic ideas	1	1	N/A

Prediction: He had fewer devices to cope with sexual feelings than in other areas. However, sexual tensions should not cause him to use technics conducive to difficult interpersonal situations.

Retrospective evaluation: In his diary Airman A described persistent sexual thoughts about his girl friend. Fantasy life is difficult to explore in a single interview. This probably explains why this particular coping device (fantasies, E-59) was not rated highly. Sexual boasting and jokes by the group ran counter to his standards but proved manageable. Predictions were generally accurate regarding responses to sexual stimulation.

DISCUSSION OF THE RESEARCH

In this experiment Airman A had to cope with an unusual situation. He considered that the major task involved in it was to maintain harmonious interpersonal relationships. His strategy for coping with this task was direct and aggressive. The coping devices used were discussions of mechanical topics and talking through personality conflicts. Helped by a strong drive toward mastery, he achieved adaptation.

The particular coping devices characteristic for him began during his second year when, as part of normal development, nerves complete myelination. Myelination allows increased mobility and manipulation of objects. At that time in his life Airman A felt optimistic about using new coping devices because a reasonable relationship existed with his mother. Mobility created an emotional need to explore which then expanded and molded his relationship with his father. Within the father-child relationship the technic of a direct aggressive approach to mechanical problems developed. Speech skills transformed this new behavior into an ability to discuss mechanical problems, which then evolved into a way of coping with peers. He could not have arrived at this specific approach to peers without the usual sequence of physiologic maturation. Parents, events, and internal affective needs at each developmental stage left an indelible mark on the final coping technics. These specific coping technics are now called into play when Airman A has a need for self-assertion and closeness or deals with someone that reminds him of his father.

Airman A's evaluation demonstrates that knowledge of behavior in terms of coping technics used during the growth sequence allows prediction of probable adult behavior. The coping technics which a person finally utilizes are chosen from a multitude of equally adaptive responses because they have satisfied emotional needs during the developmental sequence. Adult coping technics are evaluated by obtaining an individual's life history with special regard to emotional needs and developmental figures. The most feasible approach for evaluation of coping technics is to find what bits of habitual behavior are characteristic for a given individual

in specified situations. Scientific methods and developmental theory provide a basis for this kind of behavioral assessment. Similar research designs could be used in any situation where variation of habitual modes of dealing with psychologic, interpersonal, and mechanical tasks might be critical—for example, the selection of individuals for a space station.

Tape-recorded, systematically rated interviews measure the individual's habitual ways of coping. In clinical work, interview data usually is integrated by intuition. Rating on a list of coping technics yields results that are reproducible by other investigators. Coping devices rather than coping styles are utilized in the evaluation because they are discrete, objective, quantifiable units of behavior. Coping devices allow descriptions of differences in individuals who are similar for their freedom from psychopathology and amount of ego strength. For example, Airman A and his companions were also rated on separate scales of ego strengths, need intensity, and life satisfactions. On these scales ratings were uniformly high. Profiles of coping devices revealed the unique individual differences.

Developmental research centered around coping devices has maximal application to specific, protracted, and important projects. More general developmental research will establish normative baselines which can aid in economic screening and selection of personnel for unusual tasks and environments.

RESEARCH PROPOSAL

An opportunity to obtain normative developmental data was presented by a NASA contract to the School of Aerospace Medicine. It specified collection of physical and psychologic measures of adjustment for 250 rated flying officers to serve as a normative population for future selections. A design for evaluation based on their coping and development history is described below.

Functionally normal flying officers were seen at the rate of one a day. Each was administered a psychologic test battery consisting of such tests as the Minnesota Multiphasic Personality

Inventory, the Thematic Apperception Test, other objective and projective instruments, and an exhaustive physical examination. Scales were devised to measure strength of ego functions and types of coping strategy. A questionnaire was developed to obtain pertinent developmental history.

Ego functions studied include the ability to relate closely to others, control impulses, test reality, think clearly, integrate perceptions, and synthesize action. It was assumed that the strength of ego functions used to deal with fantasies summoned up by the projective tests would reflect strengths used in everyday life.

Measurement of coping strategies was also obtained from the subject's mode of approach to projective tests. Individuals were rated on scales of elaborate or limited responses, directly confronted or cautiously evaded themes, and blocked or involved emotional feelings. As with personality strength, it is assumed that patterns of approach to the cards reflect those toward problems in life. For example, subjects who are evasive in testing would be generally evasive; those who are creative on the tests should be creative in life. To obtain measurements of coping styles, rating scales similar to the one shown in table III were constructed. These will provide quantitative, analyzable, reproducible values of ego functions and coping strategies.

Evaluation of coping strategies and ego functions were considered to be complimentary. Together they will allow comparisons of groups with similar ego strengths but different coping strategies, and visa versa. Comparisons between the groups will indicate what type of person, as well as how strong a person, will most likely master specific stresses, tasks, or training.

Developmental histories were obtained from a questionnaire (see appendix II). The items in it were designed to elicit detailed descriptions of the emotional, interpersonal, and environmental events that shape personality.

Section A is concerned with the early emotional climate of the subject's home. Sections B and C provide a word portrait of

each parent. Section D is concerned with socioeconomic information. These four sections illustrate the importance of internal needs and developmental figures to personality formation.

Section E is concerned with more specific questions about events and people during developmental stages. It illustrates that events critical for one phase are not necessarily important during another. Several examples for this point can be given. Maternal depression in the postpartum attachment period has profound effects on a child's personality. Similar depressions when the offspring is older may have no lasting effect. Family moves when a child's separation fears are at a peak during his second year are more likely to leave lasting anxieties than moves at other times. A child's strength and physical stature have the most influence on personality during school age when technics for coping with peers develop. Adolescent hobbies are most formative to future careers.

Sections F and G are concerned with present adult adjustment and emotional life. From these may be made comparisons of the current life situation to historical information and other measures of adjustment.

The results obtained from the questionnaire and physiologic battery will be analyzed statistically to describe the population. Factors obtained from the analysis will allow comparisons of Air Force rated personnel and other normal groups as well as among subgroups of the population. Such comparisons serve to expand personality theory. Other groups already studied with similar measures include uncreative but well-adapted college students (23) and creative research chemists (24). Expansions of basic developmental theory will also further applied research. Data have been derived from longitudinal observations of infants and children (25), research about typical patterns of coping with specific stresses (26, 27), and communication within families (28). Results from these comparisons will enable prediction of those who should be successful in specific interpersonal and mechanical tasks. An example of a situation where criteria for prediction would be useful is the selection of fighter pilots. This type of research will show

what ego functions, coping strategies, and backgrounds are most characteristic of successful fighter pilots. Findings such as these will be useful guides for future screening and selection.

CONCLUSIONS

Clinically derived psychiatric theory concerning personality development is applicable to Air Force selection of personnel for specific tasks, training, and environments.

Coping is a theoretic construct which describes characteristic approaches toward adaptation in terms of observable behavior. Adult coping patterns stem from a universal developmental sequence. Understanding this sequence allows predictions of performance. Development normally proceeds by means of an expanding spiral of transactions with the environment. Stereotyped coping technics evolve into discrete goal-oriented behavior. The simpler modes of behavior are incorporated in more complex adult derivatives. A variety of emotions and interpersonal relationships experienced during development become part of observable adult problem-solving technics.

Inborn stages lay an epigenetic ground plan for character growth. These developmental stages are described in terms of the type of psychologic mastery achieved during each one. The stages include ones for achievement of abilities to trust, have self-control, take initiatives, learn social skills, and acquire a sense of self-identity. Adult coping devices can be traced back to each stage. Knowledge of the circumstances, emotions, and interpersonal relationships during each phase contributes to understanding adult behavior.

Successful adaptation depends on personality strength as well as coping technics. Personality is measured in terms of ego functions. Ego functions include the abilities to relate warmly, control impulses, perceive reality, synthesize action, think clearly, and psychologically defend against impulses. Personality strength

and coping styles are complementary concepts. A complete evaluation of an individual must include measures of the *way* he functions (coping) and *how well* he functions (ego strength). The selection of individuals for different tasks should include estimates of both coping style and ego strength.

A result of a preliminary research was presented to show how coping devices may be observed, categorized, rated, and used in selection procedures. A tape-recorded clinical interview based on developmental theory obtained information about individual coping technics. The interview was independently evaluated by three psychiatrists using a rating list of coping devices. This list concretely demonstrated the application of developmental theory.

A research proposal was presented to demonstrate how clinically derived developmental theory can also be adapted to statistical research. Significant questions regarding coping, ego functions, and events during development will yield significant findings. The research proposal utilizes a battery of psychologic tests to obtain estimates of ego strengths and coping styles and a questionnaire to obtain information about events during different developmental stages. Ratings of the psychologic tests and items included in the questionnaire were based on developmental theory. The results of a study of this type will provide baselines which should enable prediction of individual success in specific interpersonal and mechanical tasks.

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APPENDIX I

LIST OF COPING DEVICES

A. In relationship to his mother (or mother substitutes) he copes with desires for dependent closeness and related affects by:

1. Constructively (actively) seeking emotional closeness.
2. Constructively (passively) seeking emotional closeness.
3. Provocatively (joking or hostile) seeking emotional closeness.
4. Appropriate substitution of the object of his desires.
5. Substitution by fantasies or introspection.
6. Helping the object of his desires (role reversal).
7. Repression, suppression, or denial of need for closeness.
8. Projection of the desire for closeness.
9. Physically or emotionally distancing himself.
10. Angry denial or depression (expecting nothing).

B. In relationship to his parents (or parent substitutes) he copes with desires for autonomy and the emotions associated with them by:

11. Being as appropriately physically active as possible (sports and athletics).
12. Constructive mechanical work or play.
13. Inhibiting or withdrawing from physical activity or work (negativism or passive-aggressive behavior).
14. Compulsive attention to details.
15. Impulsive outbursts of activity.

16. Control and manipulation of others rather than of self (constructive and hostile).
17. Using an introspective or fantasy approach.
18. Isolation or shame over aggressive feelings and affects.
19. Denial, repression, or suppression of desires for self-assertion.
20. Realistic self-evaluation and acceptance of his need.
21. Free direct expression of affects.
22. Free direct expression of ideas.

C. *In relation to his father and mother (or substitutes) he copes with "masculine strivings" (taking initiatives) and the affects associated with them by:*

23. Direct, self-confident assertion.
24. Introspection and self-examination — a rational approach (self-acceptance and control).
25. Assuming a passive role (avoiding issues — using a passive-aggressive technic).
26. Attempting to take over at the other person's expense.
27. Compulsive self-control.
28. Clowning or childishness.
29. Overestimation of capacities (bragging).
30. Self-depreciation (appeals for sympathy).
31. Projection of competitive feelings and anger at other men.
32. Denial, suppression, or repression of the feelings of competitiveness.
33. Seeking physical closeness to men (a buddy).

34. Seeking physical strength and power.
35. Substituting female for male companionship.
36. Assuming a feminine role.
37. Nonrivalrous attempts at self-perfection.
38. Attempts at self-perfection through competition.
39. Resort to fantasies of success.
40. Guilt and depression in relationship to competitive feelings.
41. Talking things through with other person.
42. Retreat to peer group activities.
43. Bullying behavior.

D. He copes with problems and affects associated with relating to peer groups or siblings by:

44. Assuming a position of leadership.
45. Assuming the role of follower.
46. Cooperation without an acknowledged leader.
47. Sharing athletic activities.
48. Sharing mechanical activities or hobbies.
49. Sharing intellectual activities.
50. Talking things through.
51. Avoiding contact with others.
52. Assuming a protective role toward others.

53. Taking a passive position (passive-aggressive behavior).
 54. Seeking admiration.
- E. *He copes with sexual impulses (as exemplified by those of puberty) by:*
55. Accepting them as natural and having appropriate experiences.
 56. Premature experimentation.
 57. Avoidance of females.
 58. Asceticism.
 59. Withdrawal to fantasies.
 60. Concentrating on sports or hobbies.
 61. Concentrating on intellectual activities.
 62. Developing strong moral or idealistic values.
 63. Denial, repression, or suppression of the needs.
 64. Guilt, depression, or hostility to females.
 65. Taking a protective role with women.

APPENDIX II

DEVELOPMENTAL QUESTIONNAIRE

A. *Questions descriptive of the general emotional climate during childhood:*

1. When you were a child was your home life happy and peaceful? Did your parents get along well together?
2. Were your parents openly physically affectionate with the children? Were they with each other?
3. What was your father's job and how much did he like it? What was your mother's job and how much did she like it?
4. How much did your family enjoy doing things together? How much did your parents enjoy doing things together?
5. What was the nicest thing about your home life? If you could have, what would you have changed?
6. Which parent do you take after? What were your father's best and worst traits? What were your mother's best and worst traits?
7. Were you your mother's favorite? If not, who was? Were you your father's favorite? If not, who was?
8. What are the religions of your father, mother, wife, and self?
9. Rate the amount of family interest in the following categories:
(a) eating habits; (b) staying out late; (c) orderliness; (d) being independent; (e) family discussions; (f) discipline and responsibilities; (g) work; (h) religion; (i) physical sports; (j) mechanical things; (k) moral behavior in dating and social life; (l) not smoking or drinking; (m) manners and respect for elders; (n) sexual behavior; (o) completion of tasks; (p) health and physical illnesses; (q) getting along with a group.
10. What were your family ideals? What are you most concerned with? (Choose among money, fame, responsibility, and contentment.)

B. Questions on areas of parental agreement or disagreement:

Recall the period of time between your 6th and 15th years. Indicate in the spaces provided the frequency with which your parents agreed or disagreed in a variety of areas related to your development and future. In areas where some disagreement did exist, indicate in the last two columns who made the decisions. This question is rated in regard to: (a) discipline; (b) scholastic achievement; (c) athletic and manual ability; (d) social life; (e) future career; (f) intellectual matters; (g) moral matters; (h) the parent's social life; (i) division of responsibilities within the family; (j) family finances.

C. Word descriptions of the parents:

Rate both your father and mother on separate scales provided with regard to the following word pairs: (a) encouraging — discouraging; (b) permissive — authoritarian; (c) rewarding — punishing; (d) sympathetic — antagonizing; (e) warm — cold; (f) close — distant; (g) active — passive; (h) relaxed — tense; (i) consistent — inconsistent; (j) attractive — unattractive; (k) easy to figure out — hard to figure out.

D. Questions regarding socioeconomic information:

1. Check the population classification which best describes the community in which the major part of your childhood and youth was spent:

(a) farm or rural; (b) less than 500; (c) 500 to 4,999, etc.

2. Check the box which describes your education level and that of your mother and father. (From 0 to 21 years of school)

E. Questions about specific events during the developmental sequence:

1. How much illness or turmoil was there in the family just before or after your birth? What was it about?

2. Were parents ever separated because of father's occupation? State when and how long. Were parents ever legally separated or divorced? Why?

3. Designate, in order of birth, yourself, your brothers, and sisters. Indicate whether each brother or sister is living or dead.

4. How many times did your family move during your childhood? List your age at the time and the extent of the move.

Did anyone other than your parents (such as a nanny, maid, or grandparent) play an important role in your rearing?

5. With whom in family did you confide? What was your age? Who of the family were you most proud of?

6. During your childhood was there a death of a close relative? Who was it and what was your age?

7. What is the earliest event during childhood that you can recall? State your age when the incident occurred and describe it briefly.

8. As a child (ages 6 to 10), what was your father's view of you as a person? Were you very important to him, accepted casually, or rejected?

What was your mother's view of you as a person? Were you very important to her, accepted casually, or rejected (openly or covertly)?

9. As a child (ages 6 to 10), how did you get along with your: (a) older sister; (b) younger sister; (c) older brother; (d) younger brother; (e) father; (f) mother?

10. As a child (ages 6 to 10), did you: (a) enjoy school; (b) do well in school; (c) become suspended or expelled from school; for what? (d) regularly play with some group of children; if not, why? (e) play mostly with children older or younger than you? Why?

11. Between the ages of 6 and 10, how did you compare in physical stature with other boys in size and stature (large, average, or small; agile, average, or less agile)?

12. Rate how much affection you received up to the age of 13 from:
(a) father; (b) mother; (c) other adults.

Rate how much discipline you received from: (a) father; (b) mother; (c) other adults.

13. During childhood did you suffer from: (a) enuresis; (b) thumbsucking; (c) stammering; (d) change of handedness; (e) difficulty writing; (f) sleepwalking; (g) childhood fears? (Give the age for each symptom.)

14. Did you ever have any serious illnesses in childhood? (Check from a previously prepared list of 100 possible diseases.)

15. Between the ages of 10 and 13, were you interested in: (a) a boys' club or Boy Scouts; (b) participating in sports; (c) observing sports; (d) playing a musical instrument; (e) solitude; (f) reading; (g) being with a large group of friends; (h) a hobby; (i) a best buddy?

What was the name of your favorite book, the hobby you had, and the favorite activity you shared with your buddy?

16. In adolescence (ages 14 to 18) rate how much you enjoyed: (a) group activities; (b) two-person competitive sports; (c) team competition; (d) social games; (e) hobbies; (f) intellectual activities; (g) solitude; (h) daydreaming.

17. In adolescence did you play with children of your own age? Were you the leader of a social group, a work group, or a sport group? When you were a member but not the leader, were your suggestions accepted?

18. How much did you disagree with your parents during your teenage years? Over what? What sort of social turmoil or problems did you experience during these years?

19. What was your age when you first: (a) had a date; (b) "necked"; (c) masturbated; (d) had sexual intercourse?

20. In subsequent sexual experiences was the girl usually: (a) close to you; (b) a casual acquaintance; (c) a prostitute?

Were you usually: (a) alone; (b) with a buddy; (c) with a group of buddies?

21. Between the ages of 13 and 18, rate how much affection you received from: (a) mother; (b) father; (c) other adults.

Rate how much discipline you received from: (a) mother; (b) father; (c) other adults.

Check which type of disciplinary action you received from each: (a) physical punishment; (b) scolding; (c) depriving; (d) withholding love.

F. Questions relating to adult life adjustment:

1. What was your major interest in college? How well did you do? What are your plans for the future?

2. Where are you stationed? What is your job? Describe the events of your military career. What do you like most about your job?

3. What is your chief pleasure in flying? How old were you when you decided you wanted to fly? What activities led up to this desire? What did you think flying would be like at that time?

4. Are you married? Have you ever had a divorce, separation, or annulment? When and how long did it last? What do you like best and least about your wife? Do you quarrel? What about? Rate your wife as a companion, mother, and sexual partner. Who manages the family finances? Who chiefly disciplines the children?

5. Have you had extramarital affairs? How many? Were they with:
(a) casual acquaintance; (b) close friend; (c) prostitute?

6. List your children by age and sex. Which do you enjoy the most and the least? State why.

7. Have you had any diseases or symptoms? (Check from a list of 384 symptoms and diseases.)

G. Questions relating to the subject's emotional life:

1. What was the greatest trouble, crisis, or disappointment in your life? (a) How did it upset you? (b) How long did the reaction last? (c) How did you overcome it?

2. What was the best thing that ever happened to you?

3. Rate how often you get: (a) nervous; (b) depressed; (c) angry; (d) elated; (e) envious; (f) guilty; (g) embarrassed. State the usual cause for each of these.

4. When anxious or depressed how often do you have: (a) loss of appetite; (b) constipation; (c) diarrhea; (d) weight loss; (e) sleeplessness; (f) sleepiness; (g) feelings of hopelessness; (h) tenseness; (i) difficulty working?

5. Describe what you do about it. Rate how much you: (a) blame others; (b) withdraw; (c) hold yourself back; (d) brood; (e) become tearful; (f) speak out and defend your position; (g) act childish; (h) look for a constructive solution; (i) ignore the feeling and attend to work; (j) fight physically or verbally; (k) plunge into activities; (l) joke about it.