THE DEVELOPMENT OF A SYSTEM FOR THE CLASSIFICATION OF CHILDREN'S WRITTEN RESPONSES WHILE IMAGINING SITUATIONS RELATED TO A DENTAL VISIT

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BY

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ABSTRACT

Little attention has been directed at analyzing verbal responses to look at cognitive aspects of anxiety, particularly in the lower age levels. In view of this, a system was developed for the classification of children's written responses obtained in a 1983 pilot study designed to study various aspects of dental anxiety. The responses were elicited by asking children to imagine four situations related to a dental visit.

Studies in the psychology of language and the approach taken by a number of psycholinguistic studies suggested the methodology for developing such a system. The unit of analysis, the independent clause, was defined according to the rules of English grammar. Each unit was classified according to two types of categorization. Categories under mode of responding correspond with the three response systems or components of fear described by the Three-Systems-Model of fear. Categories under valence of responding indicate whether the units were positive or negative.

Reliability was demonstrated by having two independent raters use the system to classify the

written responses of a random sample of subjects from the larger sample. Percentage of agreement was the index of reliability used. The agreement on units and categories was, with one exception, not less than eighty percent. Analysis relating the classified verbal responses to dental anxiety scores also demonstrated the system's capability of distinguishing among low and high dentally anxious children, thus providing a measure of criterion validity.

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The aim of this study was to develop a reliable classification system for verbal responses which were given by children of both sexes aged nine to twelve years to various aspects of dentistry. The responses were obtained by asking children to imagine what they would say to themselves on being faced with each of four situations related to a dental visit. Situations to imagine were taken from the Corah Dental Anxiety scale (DAS) (Corah, 1969), a widely used instrument which asks subjects to rate their feelings about dentistry over different events which increase in proximity to actual treatment. The DAS wording of these events was modified slightly to accomodate the imagination tasks. The entire questionnaire can be found in Appendix A. Pages 3, 4, 5 and 6 contain the imagination task instructions; Page 2 contains the DAS. Since the classification system was to be used to analyze the children's written responses for qualitative information related to levels of anxiety, the review of literature includes a discussion of theories of anxiety as well as a review of methods of analyzing verbal responses. The test of any classification scheme must be its reliability. Therefore, the review of literature

relevant to this project ends with a discussion regarding methods of establishing reliability between raters.

Theories of Anxiety

Theories to explain the etiology and nature of anxiety are central to most theories of behaviour and personality. A concern of the twentieth century, the phenomenon of anxiety has been receiving increasing attention from theorists and researchers within Psychology and other disciplines. The explanations put forth will be discussed under four headings. Two of those offered are from well-established psychological orientations, namely psychoanalytic and learning theories. The other two explanations have focused more narrowly on the nature of anxiety. One is in terms of the physiological and the other, the Three-Systems-Model, gives consideration to cognitive and behavioural as well as physiological aspects of anxiety. It is hoped that the following discussion, while not a comprehensive treatment of theories of anxiety, will provide an overview of the varying and diverse approaches which have been taken.

Psychoanalytic Theory

The contribution of Sigmund Freud to our understanding of anxiety is widely recognized. His initial conception of anxiety as the result of

unexpressed libidinal energy underwent a number of modifications in the years after psychoanalysis was established. Anxiety came to be viewed as fundamental to understanding neurosis and may be best understood within the three interrelated frames of reference which are said to comprise human personality: id, ego and superego. The id, representing instinctual or biological drives, is animal-like and unreasonable in its quest for gratification. The ego is the human side of personality; it is rational and thinking and serves to mediate among id demands and the constraints imposed by a repressive external world. The superego, which develops out of conflict between id and ego, is representative of one's conscience or moral code and reflects the social values learned from parents, school, etc. The superego is inflexible in the restrictions which it imposes.

Two stages of anxiety are seen as developmentally determined. Primary anxiety is experienced with and best exemplified by the trauma of birth. This first experience of anxiety is characterized by excessive amounts of stimulation which go beyond the organism's capacity to handle it and by helplessness in the face of circumstances which pose a threat to survival. Occurring in the early months of life, primary anxiety

sets the pattern for subsequent anxiety which is experienced only after the development of ego and superego processes. In his classic book, May (1977) described the origin of anxiety in the birth trauma and fear of castration, two concepts which are seen throughout the writings of Freud. Castration is interpreted as standing for "the loss of a prized object of value in the same sense as birth stands for the loss of the mother" (May, 1977, p. 142). With the shift from primary to subsequent anxiety, the fear of castration is in reference to other "objects of value".

The ego is considered to be the center of anxiety. It must mediate among the demands of id, superego and external world and face danger from each. Corresponding to the three sources of danger are three kinds of anxiety. Reality anxiety is a reaction to danger from the external world. It is a natural part of everyday life and occurs in reference to real objects or situations. Moral anxiety is experienced when there is a perceived danger from the superego; the experience is one of guilt or shame as the superego threatens punishment upon the ego for acting or thinking in a fashion contrary to its rigid ideals. Neurotic anxiety occurs in reference to id impulses; it is the fear of what would happen should the ego fail to control

the demands of the id. The effectively functioning ego anticipates danger and exercises control by utilizing defense mechanisms (e.g., denial, repression). The energy of anxiety is thus channelled into socially acceptable behaviour. It is when the ego's defenses are overwhelmed or broken down by unexpressed psychic energy that serious psychological disturbance may result.

Freud viewed the capacity for anxiety as innate or part of the instinct for self-survival. Anxiety is considered an unpleasant emotional state distinguishable from fear in that its source is intangible or nonspecific whereas fear has an identifiable source in the environment (e.g., normal anxiety). Freudian theory has undergone a number of revisions (e.g., neo-Freudians place a greater emphasis upon environmental factors) but its major propositions are still accepted by many psychoanalytic writers. Intrapsychic events and unconscious motivations are considered to be the major determinants of anxiety. It is now widely believed that many of Freud's conceptions must be qualified or reinterpreted. Psychoanalytic theory has also been criticized by others in the field of science who contend that such theories are "untestable because they cannot be falsified by any conceivable experimental or clinical event; such

theories are therefore outside the realm of science" (Eysenck, 1976, p. 253). A number of weaknesses in the evidence upon which Freud relied have been detailed by Wolpe and Rachman (1960).

Learning Theory

Unlike psychoanalytic theories which are based largely upon observational data gathered from psychiatric patients, learning theories are based upon data derived from scientific experimentation. The general principles of learning are said to be applicable to all behaviour, including anxiety (e.g., anxiety is a learned response). An early antecedent of the current learning theory approach to fear and anxiety was J. B. Watson's classic "little Albert" experiment which demonstrated that fears may be acquired through Pavlovian classical conditioning. An 11-month-old child, known as little Albert, was found during initial testing to demonstrate no fear of animals. Fear was displayed, however, at the sound of a steel bar being struck. A white rat was placed in front of him at the same time that the steel bar was struck and the child reacted fearfully. After half a dozen of these pairings, little Albert would start crying and try to get away at the sight of the rat. A phenomenon how

known as stimulus generalization was also witnessed as little Albert became fearful at the presentation of other stimuli similar to the white rat (e.g., rabbits, a fur coat).

Watson's classical conditioning theory of fear acquisition has since been refined and elaborated upon by a number of others (Mowrer, 1939; Spence, 1956; Wolpe and Rachman, 1960; Eysenck and Rachman, 1965). Fear and anxiety are assumed to be acquired through a process of classical conditioning. Neutral stimuli become capable of eliciting fear through one or more pairings with an unconditioned response (UCR) of fear or pain. The likelihood of the conditioned response (CR) developing and the intensity of conditioned fear are determined by the number of pairings of conditioned stimulus (CS) and unconditioned stimulus (UCS), intensity of the UCS, and confinement of the subject. There is a generalization of the fear CR to stimuli resembling the CS. The conditioned fear acts as a secondary drive for fear-reducing behaviour which when executed, reduces the fear therefore reinforcing the behaviour. O. H. Mowrer's (1939) version of this theory, often termed the two-stage theory, has been widely accepted and was seldom criticized until the late sixties or early seventies. Mowrer proposed that

the relief from anxiety (or fear) which results from avoidance of the conditioned stimulus brings about a conditioned avoidance reaction (e.g., Mowrer added avoidance conditioning to Watson's classical conditioning model). Unlike psychoanalytic writers, Mowrer did not distinguish between fear and anxiety. This lack of distinction has been widely accepted by learning theorists.

However, shortcomings of conditioning theory have been subsequently pointed out by a number of writers. In particular, Rachman (1978) evaluated both the evidence in support of the theory and the main arguments against it. Conditioning theory relies on the assumption that all stimuli have an equal chance of developing fear-evoking properties given their equal prominence in the environment. This assumption, known as the equipotentiality premise, has not been verified. English (1929), in an attempt to replicate the findings of Watson, found that only selected stimuli were capable of producing conditioned fear reactions. Bregman (1934) achieved no success in a similar attempt. That certain fears (e.g., children's fear of the dark, fear of snakes) are very common while others are very rare also challenges the premise of equipotentiality. Conditioning theory does not

provide a satisfactory explanation for the genesis of phobias; it is often difficult to find the precipitant of a phobia. People also fail to acquire fear in what are normally considered fear-evoking situations. Rachman (1978) described a surprising fearlessness during air raids in World War II. People should have developed conditioned fear reactions which were strengthened by repeated exposure. In his book on fears and phobias, Marks (1969) suggested that two-stage theory fails to offer an explanation for the great resistance to extinction of avoidance responses; theoretically, with the continuation of avoidance responses, the classically conditioned CR should extinguish as it is no longer reinforced. A number of writers have cited evidence to suggest that certain fears (e.g., fear of snakes, fear of novelty, fear of heights) are innate (Gray, 1971; Marks, 1969). Marks (1969) described experiments which conclude that certain fears in animals are innate. In one such experiment, newly hatched ducks and geese displayed fear reactions when a hawk/goose model was moved over their heads. The model resembled the silhouette of a hawk (e.g., short neck) when pulled in one direction and a goose when pulled in the other direction. The goose shape did not produce a fear reaction in the chicks

while the hawk shape did. The innate response was considered of biological advantage in detecting and escaping predators. Bandura (1971) demonstrated that fears may also be acquired vicariously through observational learning and modelling.

Some of the more recent approaches serve to counter criticisms of conditioning theory. Seligman (1971) proposed the concept of preparedness to replace the premise of equipotentialiality. Prepared fears have a biological basis and are assumed to be non-cognitive. This concept, while accounting for the uneven distribution of fears, also gives some emphasis to constitutional factors and may account for the genesis of phobias. Eysenck (1973) also introduced the idea of "innateness" in his proposal that people differ constitutionally with regard to autonomic activity and introversive dispositions. Other theorists have emphasisized the symbolic and cognitive aspects of learning. Martin and Levey (1985) suggested that conditioning and cognitive contributions to adaptive/maladaptive behaviour be considered within a unified biological framework.

Physiological Explanations

Fischer (1970), in his sampling of the various

theoretical approaches to anxiety, described the physiological approach as one which attempts to clarify "the sequences of and correlation between external stimulation, physiological processes and affective experience" (Fischer, 1970, p. 53). The earliest scientific attempt at such a formulation was put forth in the 1880's by William James and Carl Lange. The James-Lange theory proposed that the individual's perception of physiological change, rather than the perception of external stimuli, is what constitutes the experience of emotion. The logical implications of such a theory are twofold: (1) an emotional reaction cannot occur without the accompanying bodily sensations and (2) emotions are distinguished by the perception of recognizably different bodily sensations. In the 1920's, Walter Cannon and Philip Bard demonstrated that animals which were deprived of all autonomic activity will display behavioural responses to emotional stimulation. This would not have been possible by the James-Lange theory which lost support in light of the contradictory evidence. Cannon and Bard suggested that bodily reactions and emotional experience arise simultaneously mediated by the two lower brain centers of thalamus and hypothalamus. Anxiety and all other emotions were considered to be the effect of external

stimulus conditions mediated through structures of the central nervous system. With time, this theory was also shown to be too simple.

The emphasis upon brain areas or structures involved in emotion led J. W. Papez and P. D. McLean to speculate that the center of emotional control in the brain is the limbic system. Neurosurgical investigation has since shown beyond doubt that the limbic system plays a role in emotional expression. In 1951, D. B. Lindsley put forth an activation theory of emotion in which emotional arousal was said to be related to the degree of cortical activity. Direct electrical stimulation to certain areas of the reticular formation (located in the brain stem and intimately related to the level of cortical functioning) was discovered to immediately cause a person to fall asleep or awaken. This system was therefore called the reticular activating system (RAS). R. B. Malmo subsequently proposed that the RAS controls the possibility of experiencing anxiety; a weakening of the inhibitory aspect of the RAS was said to permit too many facilitative impulses to be discharged to the cortex, leading to a level of arousal beyond optimal. The theory of general arousal, which holds that physiological arousal is emotionally nonspecific, is

related to the RAS formulation. The particular emotion being experienced is considered a function of the perceptions and cognitions of the subject.

In keeping with the theory of general arousal, Schacter (1964) named two factors necessary to producing emotional states: an undifferentiated state of arousal and the cognitions which the subject uses to label the arousal. Schacter did not look for brain areas to distinguish among different emotions but theorized that it is cognitive set which determines whether the emotional state is one of fear, anger, etc. Lang (1971) suggested that Schacter's two-factor theory is attractive for the following reasons: it doesn't focus on brain mechanisms to the exclusion of cognitive and autonomically mediated response events, it may be examined in a laboratory, and it is interactive in that it doesn't assume a one-way path of influence. The theory was criticized, however, on the grounds that "it is too narrow a conception to handle much of the relevant data, and the experiments in its support are open to serious criticism" (Lang, 1971, p. 104).

Three-Systems-Model

In contrast to earlier conceptions of fear as a single system (psychoanalytic and learning theories) and

Schacter's two-factor theory of fear and emotion is the Three-Systems-Model. Fear and anxiety are not distinguished from each other and are seen as comprising three components or response systems: cognitive/verbal, physiological and behavioural/motoric. This model, originally proposed by Lang (1971, 1978) and supported in the work of Rachman (1977, 1978) (Hodgson and Rachman, 1974) (Rachman and Hodgson, 1974), has become very influential in recent years. Rachman (1978) describes fear as "comprising three main components: the subjective experience of apprehension, associated psychophysiological changes, and attempts to avoid or escape from certain situations" (Rachman, 1978, p. 4). The three components are described by Lang (1971) as loosely coupled. Although highly interactive, they are partially independent and may respond differentially at any given time (e.g., discordance). Unlike Schacter's two-factor theory which has a major proposition that emotional experience will not occur in the absence of physiological arousal, fear is considered not uniquely determined by any of the three systems. Self-reports of fear have correlated moderately well with avoidance behaviour and only modestly well with physiological measures (Rachman, 1978). System sensitivity appears to differ across

individuals, across the different fear stimuli and under different conditions of administration (Lang, Levin, Miller, and Kozak, 1983).

Lang's theoretical approach was drawn primarily from laboratory findings on fear reduction in which measures of the different fear components were sometimes found to show high correlations and at other times low correlations (Lang, 1970). As well as not being perfectly correlated at a given point in time, the three systems also show different rates of change. Rachman and Hodgson (1974) use the terms synchrony and desynchrony to refer to the degree of covariance of the changes among the three systems. Desynchronous changes may covary, vary inversely or vary independently. The order of change generally proceeds from autonomic to behavioural and then to verbal systems. Studies described by Leitenberg, Agras, Butz and Wincze (1971) demonstrating that behavioural improvement and psychophysiological changes may occur independently, lend further support to the Three-Systems-Model. Rachman (1978) demonstrates a discordance among response systems in people who are experiencing the stress of war or combat conditions and suggests that "courage" may be evidenced in people who experience subjective fear and psychophysiological

disturbances but do not display avoidance behaviour. Looking at the response systems of agoraphobics during treatment, Vermilyea, Boice and Barlow (1984) found treatment effects to be clearer for synchronous than desynchronous patients and treatment non-responders to be most often in the desynchronous patient category.

Hodgson and Rachman (1974) hypothesized that the degree of concordance or synchrony between response systems could be predicted by five factors: intensity of emotional arousal, level of demand, therapeutic technique, length of follow-up, and the specific physiological system being measured. Concordance between response systems was predicted to be high during strong emotional arousal and low during mild emotional arousal. This hypothesis, particularly the first half, has received some support (Sartory, Rachman and Grey, 1977; Craske and Craig, 1984). The second hypothesis that concordance would be greater under low levels of demand while high-demand conditions would produce discordance was supported by Grey, Sartory and Rachman (1979). Evidence appears inconclusive for the third hypothesis which predicts that the degree of synchrony following treatment is dependent upon the particular therapy used (e.g., flooding was believed to produce desynchrony while

participant modelling was believed to produce synchrony). The fourth hypothesis, that concordance increases during follow-up, has received some support (Lande, 1982). There has also been some evidence in support of the fifth hypothesis, that desynchrony between physiological and other response systems would be greater when skin conductance rather than heart rate was measured (Craske and Craig, 1984).

The Three-Systems-Model adds to other theories by showing the complex nature of fear and anxiety and isolating specific components. This new conception of fear implies that the measures used are a very important consideration in the assessment and treatment of fears and anxieties (e.g., subjects may vary unpredictably along the three dimensions in response to the same stimulus). In a critical examination of the model's theoretical and clinical implications, Hugdahl (1981) suggested that there are some weaknesses of definition which need to be addressed. He described three possible interpretations for the cognitive component of fear: (1) the subject, in perceiving his physiological arousal, cognitively labels it fear or anxiety, (2) the subject is showing anticipatory fear in the form of worrying or having negative thoughts in advance of exposure, and (3) the

subject experiences changes of mood and feelings of unreality, guilt, self-blame, etc. Rachman (1978) pointed out that while there are still some unresolved difficulties (e.g., an incomplete understanding of the relationships among the three components), there is much to be gained by expanding our view of fear to encompass the Three-Systems-Model. Wide enough to cover all aspects of anxiety responding, this model appears most suitable to use as a basis for classifying anxiety responses to imagined situations. Lang (1977) suggested that it is the imagined response propositions (how the individual imagines that he will respond to a given situation) which plays a central role in the fear process. These response propositions can involve verbal, behavioural and/or visceral responses.

CLASSIFICATION OF VERBAL RESPONSES

Little attention has been directed at analyzing verbal responses to look at fears and anxieties, particularly in the lower age levels where other research methods are usually relied upon (Mussen, Conger, and Kagan, 1979; Mash and Terdal, 1982). The growth of Cognitive Psychology has also brought about an increased interest in the cognitive processes associated with the experience of anxiety (Sarason & Sarason, 1984). It is assumed that a classification system for verbal responses would provide qualitative information related to levels of anxiety. The development of such a system must start with defining a particular unit of analysis.

Verbal Units of Analysis

The pioneering work of George Miller (1951) has contributed a great deal to studies in the psychology of language. His suggested approach for developing systems to classify verbal units of analysis has been adopted by many psychologists, particularly those whose area of expertise is psycholinguistics. Miller took a scientific and psychological orientation to the study of language and communication and viewed the

psychology of human verbal behaviour as little or no different from the psychology of behaviour in general. People respond to words in the same manner that they respond to other stimuli in their environment; words are signs to represent the objects or ideas they represent. Stimuli affecting an organism's behaviour do not appear in random, unorganized ways. For example, a chair is clearly distinguishable from a desk because of the components which make it up. The same holds true for verbal stimuli. Sentences hold words together as units and the component parts complement and modify one another according to the pattern which they take (Miller, 1951, p. 4). The speaker or writer is constrained by the structure of the language he uses. A society agrees upon a set of symbols and rules for combining words such that the conventions are not arbitrary. For instance, the successive words in an English sentence are related such that the next word (e.g., I will go to the . . .) is partially determined by the context of the words around it.

The conventions of human behaviour, whether verbal or other, make possible the analysis of specific units of behaviour. The behavioural units are usually defined arbitrarily to suit the purpose of a particular study. Addressing the statistical properties of language,

Miller (1951) suggested that there are many possible verbal units - words, phrases, clauses, sentences, letters of the alphabet, etc. He further suggested that the choice depends upon the interest, with the only restriction being that we must be able to recognize the unit when it occurs. A unit may be recognized and described according to the rules that define it. In the case of verbal behaviour, these are usually the rules of English grammar. In their comprehensive and often-referenced work, Quirk, Greenbaum, Leech and Svartvik (1972) defined grammar as a complex set of rules which specify combinations of words into larger units. Stating the general rules about sentence construction, for example, requires that reference be made to the smaller units which form the sentence (e.g., subject, verb). More recently, Deese (1984) defined a sentence as a set of linguistic elements which are related to each other; the relations of the sentence consist of putting the terms in a proposition together appropriate to the grammar of a particular language and relating the propositions one with another (Deese, 1984, p. 29). All standard textbooks describe at least three types of sentences: simple, complex and compound. These are distinguished according to the number and type of

clause which they contain (e.g., a clause contains one subject and one verb).

In addition to the quantity of information communicated as indicated by the number of verbal units, the content of oral or written language may also be looked at. People express their attitudes toward subject matter by the choice of particular words, phrases, repetitions and in the case of oral speech by intonations, pauses, etc. With any classification system for verbal units, the reader must judge which category includes a particular word pattern. If these judgements are to be consistent and repeatable by others, then the rules must be clearly stated. Miller (1951) has stated that "no classification of the content of verbal units is scientifically acceptable unless its categories are derived on the basis of explicitly formulated rules" (Miller, 1951, p. 95). Flexibility of the system is considered unavoidable since it is too large a task to make an exhaustive study of all possible word patterns. We may decide to ignore many distinctions and group different word patterns together in a single category in order to limit the number of categories that must be listed. Distinctions ignored in one study may become important in another study. Categories are chosen based upon the questions asked and

placement of a unit in a particular category depends upon the stated criteria. A list of indicators is usually drawn up to provide further clarification. The list may contain words or phrases indicative of certain attitudes, for example.

Studies making use of language units are undertaken mostly in the area of psycholinguistics, described by Peterson and McCabe (1983) as an approach to language in terms of how groups of persons, on average, react to particular segments of a language selected to represent some general principle. They suggest that present psycholinguistic analysis are very different from past ones and the difference is in regard to the unit of language subjected to analysis; early psycholinguists concerned themselves with the word whereas present analyses make use of discourse or text (e.g., units of language that go beyond the sentence). Peterson and McCabe looked at how language develops after age three by analyzing transcripts of children's narratives (stories about their personal experiences, produced orally) in terms of both syntax and semantics. Narratives were broken into narrative or independent clauses for analysis. McCabe and Peterson (1985) analyzed naturalistic productions of "because" and "so" by children aged three and one-half years to nine and

one-half years in a study of psychological causality as reflected by errors in the use of causal connectives. These and other studies of language development in children have found, for example, that children's vocabulary increases slowly at first, then rapidly between two and eight, and then more slowly until maturity. The number and length of children's verbal responses have been found to increase as well as become increasingly complex. Early one-word sentences are replaced with simple sentences during the second and third years. From age four on, the frequency of simple sentences declines as more complicated constructions come to be used (Miller, 1951; McCarthy, 1954). Hunt (1983) described the T unit or main clause (e.g., independent clause) as a better index for studying language development than the sentence.

On the other hand, studies making use of verbal responses to study affects such as anxiety appear very limited. Ericsson and Simon (1980), evaluating the utility of verbal reports as data, suggested that this type of data has been suspect since the triumph of behaviourism. Though they provide the basic behavioural data in standard experimental paradigms (e.g., responding yes or no), modern psychology has been vague about other types of verbalizations (e.g.,

retrospective answers and more open-ended types of responses). Because of the general notion that verbal reports provide only information to be verified by other data or to generate hypothesis, there has been little concern regarding methodological questions about how such data will be collected and analyzed. Ericsson and Simon suggested that this is an unsatisfactory state of affairs in light of the current focus upon understanding human cognitive processes. A more positive view of verbal data than that presented by Nisbett and Wilson (1977), Ericsson and Simon concluded that verbal reports, elicited with care and interpreted with a proper understanding under which they were obtained, are a valuable and reliable information source of cognitive processes. Gottschalk (1967) attempted to develop a reliable and valid method of quantifying transient affects of emotion and psychological states through classifying oral speech samples for both content and structural or form aspects of talking (e.g., illogical statements). Among the features utilized were the frequencies of occurrence (per unit of time) of categories of verbal themata. Two affects studied in detail were hostility and anger. Gottschalk (1978) also looked at oral speech samples; a verbal behaviour method was used to measure the

severity of schizophrenic syndrome with respect to cognitive defects. The clause was one of the units of measure and categories were developed by setting down the thematic and formal characteristics believed to vary with the severity of the schizophrenic syndrome. Using speech and speech samples as indicators of stress levels, Spence (1982) chose to investigate how the choice of words are influenced by unconscious background factors (e.g., lexical leakage).

In summary, the work of Miller has been widely applied. Though the techniques which he described have been used mostly by psycholinguists to study language development, they have nevertheless proved useful in other types of studies. Only a relatively small number of studies have looked at the content of language as reflecting emotional states but these have also made use of the methods described by Miller. The aims of a study are used as a guide in selecting a unit of analysis; the unit is recognized according to the rules that define it and the list of indicators provided. Categories to classify the unit content are also clearly defined such that the judgements are consistent from one reader to another.

Reliability of Observational Studies

Standard textbooks on psychological measurement generally treat reliability as a central topic. Its definition is remarkably uniform: "A reliable instrument is one with small errors of measurement, one that shows stability, consistency and dependability of scores for individuals on the trait, characteristic, or behavior being assessed" (Mitchell, 1979, p. 376). The study of reliability has generally been restricted to standardized intelligence, achievement and personality tests. However, some tests are being replaced in certain branches of psychology (e.g., developmental and educational) by observational studies which vary widely in content and method. Reliability of observational methods has not received the same attention as the reliability of more traditional methods.

The three most common methods of assessing test reliability are (1) obtaining scores on two parts of the one instrument or on two very similar instruments (split half or alternate forms reliability), (2) obtaining two scores from two separate administrations of the one test (test-retest reliability), and (3) obtaining two separate scorings of the same test instrument

(interscorer or intrascorer reliability). Each of these methods produces two scores for each subject in the group; the correlation between them is generally the reliability of the test instrument. Central to the theory of reliability is the concept that every test score is comprised of two parts: a true score to indicate the presence or extent of some characteristic, behaviour, etc. and an error score which is random and independent of the true score. The correlation between the two parts provides an estimate of the amount of variance accounted for by each of error score and true score.

When a test is scored by more than one person or a performance judged by more than one rater, there arises the question of interscorer or interrater reliability. Mitchell (1979) suggested that the reliability of observational data may be considered in three ways. The researcher could focus on the extent to which two observers, working independently, agree on what behaviours are occurring. A coefficient to reflect the extent of the agreement may be used to report reliability. Secondly, the observational measure could be considered a special case of a standardized psychological test and the definitions of reliability that come from classic psychometric theory could be used

(e.g., test-retest, alternate forms). Finally, an observational measure could be thought to provide data that are under the influence of a number of different aspects of the observation situation. Consideration is given to the different facets (scorers, forms, occasions, subjects) that contribute to the overall variation in test scores.

The most commonly used index of the quality of data in observational studies is interobserver agreement. Brown (1983) described three methods of calculating interscorer agreement. The simplest and most commonly used method is one of calculating the percentage of scores (either total scores or scores on individual items) which agree. The advantages of this method are simplicity and ease of use. A frequently cited problem, however, is the question of whether only exact matches will be counted as agreements or whether scores varying within some range will also be counted as agreements. Cases in which the assigned scores vary widely may be treated no differently than mild disagreements when, in fact, they represent differing degrees of accuracy. Another problem with the interobserver agreement percentage, cited by Mitchell, is that some agreement can be expected between independent observers on the basis of chance alone; behaviours with very high or low

frequencies may have high chance levels of agreement. The first problem may be avoided by using the second method of calculating interobserver reliability. Average disagreement is calculated by finding the difference in scores assigned to each test and taking the mean of these descrepancy scores. This approach is considered preferable over the first when the range of potential scores is wide (e.g., exact matches are uncommon). A third method is to use the correlation between scorers as an index of reliability; this method treats scorers as equivalent forms of a test. Though this approach indicates whether persons were ranked in the same order, it doesn't indicate whether they assigned the same mean or range of scores.

Efforts have been made to develop indices which do not have the inherent difficulties of the interobserver agreement percentage. While the alternative methods have been designed to overcome shortcomings such as chance levels of agreement, they pose other types of problems such as complicated designs and introduce other types of measurement error (Mitchell, 1979). A final point about interobserver or interrater agreement worth mentioning is in regard to the number of raters or observers. More than two scorers may be used to assess reliability. In this situation, the techniques used with two scorers

may be used with each pair of scorers and the average degree of agreement calculated.

In summary, the above review provided an operational definition of anxiety in terms of three response systems through which fear may be manifested. It also provided the basis for a methodology that may be used to develop a system for classifying verbal responses. Several ways of assessing rater reliability were suggested by the review.

DEVELOPMENT OF CLASSIFICATION SYSTEM

The system was developed in two stages: part 1 involved the selection and definition of a unit of analysis and part 2 involved the development of classification categories to analyse each unit for anxiety content.

The Unit of Analysis

The work of Miller (1951) helped to clarify how a verbal unit of analysis may be chosen and defined. The ideas put forth by Miller and others (e.g., Deese, 1984) and the methods used by those who study psycholinguistics (e.g., McCabe and Peterson, 1985) led to the following decisions: (1) the unit selected will depend upon the needs and interest of the study, (2) the rules of grammar will be used to describe or define the unit, and (3) the unit will be recognized according to these rules and the list of indicators or examples provided. Examination of a sample of children's written responses (from questionnaires discarded because of incomplete information) for indications of anxiety was followed by a study of English grammar.

Though the work of a number of authors of English grammar was utilized, the work of Quirk et al (1972) was

most extensively used because of its comprehensiveness and a style of presentation which does not pose great difficulty for the grammar novice. Consideration was first given to selecting out verbs and descriptors (e.g., adjectives and adverbs) from among the written material. However, problems became evident when surveying children's self-statements with a view to ease of application and capability of capturing anxiety indicators. Some units were difficult to distinguish from the surrounding text, some overlapped with others such that separating them into two or more units would have provided only redundant information, and, more importantly, there would have been problems in classifying the units for content since the meaning of words or phrases may change substantially when separated from the context of the sentence in which they were written.

The independent clause was decided upon as the unit of analysis because it can function alone to form a basic or simple sentence; it does not depend upon the other parts of the sentence to convey a meaning. It has the advantage over verbs and descriptors of providing information that is more complete and less likely to be misinterpreted. For example, classification of the unit "I would be very upset if I could not go to the dentist"

would be very different from classification of the unit, "upset". The rules of grammar were used to describe the independent clause and to outline the criteria for breaking up sentences into their respective units. Some decisions on "unusual cases", or written responses which posed difficulty in determining the number of units present, were based upon whether there appeared to be one or more different thoughts or ideas.

Two Types of Categorization

In keeping with the Three-Systems-Model of fear and anxiety, an examination of children's self-statements revealed three types as being distinguishable from each other. These were (1) statements indicating how the subject was thinking (e.g., worrying, wondering) or what he or she was thinking about (e.g., having to get a needle), (2) statements referring to specific feelings which the subject would (or would not) be experiencing, and (3) statements referring to physical actions which the subject would (or would not be) performing. The first type of categorization was thus termed Mode of Responding. The original three mode of responding categories were: Cognitive, Feeling and Active/Motoric. The Cognitive category may be viewed as comprising those

responses which give an indication of the subject's thoughts or thought processes and would therefore indicate whether the child was experiencing fear or anxiety through worrying or having negative thoughts about the dental visit. The Feeling category comprises those units which refer to physical or emotional feelings and would therefore contain indicators of physiological arousal. The Active/Motoric category includes those units in which the subject makes reference to physical actions and would thus give indications of avoidance behaviour.

Cognitive and Feeling categories were further divided. Cognitive-Uncertain units are those cognitive units in which the subject indicates an uncertainty in his or her expectations about the dental visit. Cognitive-Certain units give no indication of uncertain expectations. Bodily and Non-Bodily Feeling categories distinguish between feelings which are specifically physical (e.g., sick, shaky) and those which are more general emotional feelings (e.g., happy, sad). These additional categories, suggested by the sample of children's self-statements looked at, were included in the event that they might reflect qualitative differences among low and high dentally anxious children.

In order to assess the presence or absence of anxiety in the different types of self-statements, it was necessary to include a second type of categorization: Valence of Responding. The initial three valence of responding categories decided upon were Positive, Neutral and Negative. Positive self-statements are those which indicate that the child is responding favorably to the dental visit; positive coping strategies are used and the visit is a pleasant experience. Negative self-statements indicate the opposite. Neutral units are those which cannot be interpreted as either positive or negative. Additional categories were included to accomodate the varying types of valence evidenced in the sample of children's writing looked at. If later analysis showed no significant differences among them, they were to be collapsed into the original three categories. All categorizations are fully described in the manual (Appendix B).

ASSESSMENT OF RELIABILITY

Reliability was assessed by having two independent raters use the system to classify the written responses of a random sample of subjects (15%) in a 1983 pilot study designed to investigate dental anxiety. Minitab computer software (Ryan, Joiner, and Ryan, 1982) was used to generate 230 random numbers from within the number range 1 to 1541. Numbers generated were matched with the codes assigned to each questionnaire. Statistical tests (Chi Square test for sex and t-tests for age, DAS, and other variables) confirmed that the two samples were not significantly different from each other. The percentages of males and females in each of total sample and sub-sample are given in Table 1. The means ($\overline{X}$) and standard deviations for age and DAS are also given in Table 2.

Table 1

Comparison of total sample and sub-sample on sex distribution

	Total Sample(N=1541)	Sub-Sample(n=229)
Males	52.8%	52.6%
Females	47.2%	47.4%

Note: One questionnaire was dropped from the sub-sample because it did not contain written responses to any of the four tasks.

Table 2

Comparison of total sample and sub-sample on age and DAS scores

	Total Sample(N=1541)		Sub-sample(n=229)	
	$\bar{X}$	S.D.	S.D.	$\bar{X}$
Age	10.99	1.70	10.96	1.33
DAS	8.74	3.04	8.56	2.95

Raters were university graduates with major coursework in Psychology. Each was provided with a copy of the manual, accompanying record forms (Appendix C), and questionnaires containing written responses to four imagination tasks. Before classifying responses in the sub-sample, raters were given time (approximately two weeks) to study the manual, to independently classify the responses in questionnaires excluded from the analysis, to compare their recordings and to clarify any areas of ambiguity. Thirty minutes per questionnaire (or per 4 imagination tasks) was the time allocated to classify the verbal responses.

Following the study and practice period, raters proceeded to independently classify the responses contained in the sub-sample of questionnaires. When the system had been applied to 25 questionnaires, a preliminary reliability assessment was made for each of the units and two types of categorization. The reliability or levels of agreement at not less than 80% were considered appropriate and raters continued to apply the system to the remaining questionnaires. Based upon the suggestions of raters, the original manual was revised to clarify any gray areas. Changes were mainly in the form of adding more examples to the mode of responding and valence of responding categories.

Percentage of agreement was the index of reliability used. The general formula was 'number of agreed/(number of agreed + number of disagreed)' (McCabe and Peterson, 1985). Reliability of units was calculated by (a) totalling the number of verbal responses for which raters would have to record how many units were present (subjects x tasks, or 229 x 4), (b) finding the total number in a for which raters agreed upon how many units were present, and (c) dividing b by a. Calculations were carried out through the use of SPSSX computer software (SPSS Inc., 1984). The reliabilities of Mode of Responding and Valence of Responding categorizations were calculated only on agreed units (e.g., where raters were in agreement on the number of units present). The difficulty is evident, for instance, if we are trying to compare three units recorded by the first rater on Task 1 of a particular questionnaire with the four recorded by the second rater. Reliability of Mode of Responding was determined by (a) totalling the number of agreed units across tasks and subjects (e.g., ignoring the distinctions between tasks and subjects and considering only units), (b) totalling the number of units in a for which raters assigned the same mode of responding code, and (c) dividing b by a. This technique was also used to assess

agreement on Valence of Responding.

Reliability of each of the categories under mode of responding and valence of responding was also determined. These agreement levels were used to determine whether some categories were weaker than others and therefore should not form categories in themselves. The three steps involved may be described by considering the mode of responding category, Cognitive-Uncertain, as an example: (a) agreed units classified as Cognitive-Uncertain by at least one of the raters were totalled, (b) the number from a classified as Cognitive-Uncertain by both raters was obtained, and (c) the total in b was divided by the total in a. This method was also used to calculate reliability for all other mode of responding and valence of responding categories.

The percent agreement obtained on units was 85.48. Overall agreement levels on mode of responding and valence of responding categorizations are given in Table 3. Agreement on the individual categories is shown in Table 4.

Table 3

Overall reliability of two levels of categorizations

	Percent Agreement	Units
Mode of Responding	84.18	1776
Valence of Responding	84.94	1776

Table 4

Relability of categories

Mode of Responding		Valence of Responding	
Active/Motoric	72.63 (N=190)	Positive	69.27 (N=384)
Cognitive-Uncertain	78.13 (N=503)	Positive-Conditional	48.28 (N=29)
Cognitive-Certain	68.45 (N=618)	Positive-Not Negative	79.00 (N=268)
Feeling-Bodily	53.52 (N=213)	Positive-Not Neg-Cond	91.00 (N=11)
Feeling-Non-Bodily	80.69 (N=518)	Neutral	70.00 (N=608)
Unclassifiable	60.00 (N=15)	Negative	82.00 (N=594)
		Negative-Conditional	48.00 (N=58)
		Negative-Not Positive	69.00 (N=77)
		Negative-Not Pos-Cond	25.00 (N=44)

Along with the percent agreement for each category, Table 4 also gives the number of units for which one or both raters assigned the code for that category. The number of units for the different mode of responding categories do not equal the total number of units

(1776) because of overlapping units. For instance, a unit classified as Cognitive-Certain by one rater may be classified as Active/Motoric by another rater. Similarly, units in the valence of responding categories will not total 1776.

Since there were agreement levels below 80% (considered a respectable cutoff point), some of the categories were combined. The two Cognitive categories were collapsed into one as were the two Feeling categories. The Active/Motoric category fell below 80% agreement but because of the few units in this category and the thought that a larger sample might have produced greater reliability, it was left as a separate category. Valence of responding categories were also collapsed into two: positive/neutral and negative. Some valence categories included very few units and assessing them for reliability was not justified. A separate category for Unclassifiable units is always desirable but again, the small number of units did not justify a test of reliability. Agreement on collapsed categories is given in Table 5.

Table 5

Reliablity of collapsed categories

Mode of Respnding		Valence of Respnding	
Active/Motoric	72.63 (N=190)	Positive/Neutral	93.00 (N=1152)
Cognitive	86.25 (N=1040)	Negative	89.00 (N=688)
Feeling	84.65 (N=684)		

RELATIONSHIP TO DAS

Since the system was designed to study cognitive aspects of dental anxiety, the classified verbal responses were related to DAS scores. Multiple regression analyses were performed on the data through the use of SPSSX computer software (SPSS Inc., 1984). Predictors were the percentages of units assigned to the different mode of responding/valence of responding combination categories. For example, a negative cognition score is the percentage of all units classified under both Cognitive mode of responding and Negative valence of responding. Results of the analyses are shown in Tables 6 and 7.

Table 6

Multiple regression of self-talk predictors with DAS for total group and both sexes

Groups	Predictors	r	R	Beta
Total	negative feeling	.39**	.39	.42
	negative cognition	.28**	.54	.30
	negative active/motoric	.30**	.58	.22
	positive feeling	-.31**	.60	-.14
Males	negative cognition	.36**	.36	.45
	negative feeling	.31**	.54	.41
Females	negative feeling	.46**	.46	.44
	negative active/motoric	.43**	.60	.34
	positive feeling	-.33**	.65	-.18
	negative cognition	.20*	.67	.17

*$p < .05$
**$p < .01$

Table 7

Multiple regression of self-talk by situations predictors with DAS scores

Groups	Predictors	r	R	Beta
Total	negative feeling (waiting room)	.33**	.33	.24
	negative cognition (appointment)	.28**	.44	.28
	negative feeling (appointment)	.32**	.52	.23
	negative active/motoric (dental chair)	.27**	.56	.21
	negative cognition (filling)	.23**	.60	.22
	negative feeling (filling)	.22**	.61	.13

*$p < .05$
**$p < .01$

Predictably, DAS scores were significantly correlated with negative self-talk under all three categories reflecting mode of responding. When the sexes were analyzed separately, differences were observed. The important predictors of dental anxiety in males, in order of magnitude, were negative cognitions and negative feelings. The important predictors of dental anxiety in females, in order of magnitude, were negative

feelings, negative behaviours, positive feelings, and negative cognitions. Unexpectedly, when situations were analyzed separately, in-chair situations were exceeded by negative self-talk earlier in the sequence of events leading to dental treatment, therefore showing the importance of anticipatory anxiety.

DISCUSSION AND CONCLUSIONS

The purpose of this project was accomplished. A viable classification system for children's self-talk was developed and reliability established. The three systems were reflected in children's verbal responses and respectable levels of agreement were obtained on both units and categories. Since agreement on each of the categories taken separately revealed some to be weaker than others, certain ones were collapsed to produce higher levels of agreement (e.g., 80% or greater). Because it was the smallest mode of responding category (e.g., fewer units), Active/Motoric was kept as a separate category despite a percentage agreement less than eighty percent. It is not surprising that the Cognitive category comprised most of the units and the Active/Motoric category the least since children were asked to record their thoughts and therefore use cognition. For the most part, the collapsed categories were those initially decided upon (e.g., Cognitive) but which had been further divided to accomodate patterns observed in the children's writing. Children were observed to have several ways of conveying positive and negative valence and it was thought that there might be some gradation of valence.

Only two categories remained under valence of responding: Positive/Neutral and Negative. Combining Positive and Neutral seemed appropriate since a neutral attitude toward dental visits may be looked at as positive; most people who visit the dentist regularly do not feel particularly happy or unhappy about it. Raters also indicated some problems in this regard when there were units very different from the examples provided in the manual.

Results of the analysis relating the classified verbal responses with DAS scores suggest that the final categories are capable of distinguishing among the different types of self-talk. The system demonstrated a capability to differentiate among high and low dentally anxious children, thus providing a measure of criterion validity. Sex differences were also found. The analysis also suggested a pattern for age in that older children gave more Cognitive responses than did younger children (Appendix D). While not fully investigated in this project, it would be interesting to analyze the larger sample for age differences. Though the units and classification categories have worked well, the manual will be rewritten to reflect changes in the two types of categorization. A simpler and more streamlined manual will be made available.

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APPENDIX A

Questionnaire

Today's Date: _____

School: _____

Class: _____

Name: _____

Age: _____

Sex(Boy or Girl): _____

Date of Birthday: _____

Address: _____

Telephone: _____

Have you ever visited a dentist?

Yes _____ or No _____

No. .....

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1. Imagine you have just received an appointment to go to the dentist tomorrow - how would you feel about going?

(a) I would look forward to it as a reasonably enjoyable experience. (...)
(b) I would not care one way or the other. (...)
(c) I would feel a little uneasy or squirmish about going. (...)
(d) I would be afraid that it would be unpleasant or painful. (...)
(e) I would really be very frightened of what the dentist may do. (...)

2. When you are waiting in the dentist's waiting room for your turn in the dental chair, how do you feel?

(a) Relaxed and happy. (...)
(b) A little uneasy but not too bad. (...)
(c) Worried about it. (...)
(d) Afraid. (...)
(e) Really very frightened. (...)

3. When you are sitting in the dental chair waiting while the dentist gets ready to clean your teeth, how do you feel?

(a) Relaxed and happy. (...)
(b) A little uneasy but not too bad. (...)
(c) Worried about it. (...)
(d) Afraid. (...)
(e) Really very frightened. (...)

4. When you are in the dental chair waiting to have a filling done, how do you feel?

(a) Relaxed and happy. (...)
(b) A little uneasy but not too bad. (...)
(c) Worried about it. (...)
(d) Afraid (...)
(e) Really very frightened. (...)

5. How do you think most children your age feel about going to the dentist?

(a) Relaxed and happy. (...)
(b) A little uneasy but not too bad. (...)
(c) Worried about it. (...)
(d) Afraid. (...)
(e) Really very frightened. (...)

No. .....

I. Imagine you have just received an appointment to go to the dentist tomorrow. Think as hard as you can about it and when I say "Stop", please write as quickly as you can, in the space below, what you were saying to yourself.

2. Imagine you are waiting in the dentist's waiting room for your turn in the dental chair. Think as hard as you can about it and when I say "Stop", please write as quickly as you can, in the space below, what you were saying to yourself.

3. Imagine you are sitting in the dental chair waiting while the dentist gets ready to clean your teeth. Think as hard as you can about it and when I say "Stop", please write as quickly as can, in the space below, what you were saying to yourself.

No. .....
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4. Imagine you are in the dental chair waiting to have a filling done. Think as hard as you can about it and when I say "Stop", please write as quickly as you can, in the space below, what you were saying to yourself.

I. How often do you go to see your dentist?

(a) Once or twice a year (...)
(b) Less than once a year (...)

2. Do you go to your dentist for regular check-ups?

(a) Yes (...)
(b) No (...)

3. Do you go to see your dentist only when you have a toothache?

(a) Yes (...)
(b) No (...)

1. How sure are you that you could jump as high as 1 foot (or 30 centimeters)? Please circle the number on the line below that matches how sure you are that you could jump this high. Remember that the more sure you are the higher the number you circle and the less sure you are the lower the number you circle.

10	20	30	40	50	60	70	80	90	100
Not Sure			Maybe			Pretty Sure			Real Sure

2. How sure are you that you could jump as high as 2 feet (or 60 centimeters)? Please circle the number on the line below that matches how sure you are that you could jump this high. Remember that the more sure you are the higher the number you circle and the less sure you are the lower the number you circle.

10	20	30	40	50	60	70	80	90	100
Not Sure			Maybe			Pretty Sure			Real Sure

3. How sure are you that you could jump as high as 5 feet (or 150 centimeters)? Please circle the number on the line below that matches how sure you are that you could jump this high. Remember that the more sure you are the higher the number you circle and the less sure you are the lower the number you circle.

10	20	30	40	50	60	70	80	90	100
Not Sure			Maybe			Pretty Sure			Real Sure

4. Children who are well-behaved at the dentists' try to keep still without moving their heads, do what the dentist tells them to do, and don't complain or cry. If <u>you</u> went to the dentist today, how sure are you that you would be well-behaved?

Please circle the number on the line below that matches how sure you are that you would be well-behaved. Remember that the more sure you are the higher the number you circle and the less sure you are the lower the number you circle. Please be honest and mark how you really feel right now.

10	20	30	40	50	60	70	80	90	100
Not Sure			Maybe			Pretty Sure			Real Sure

APPENDIX B

Manual

A CLASSIFICATION SYSTEM FOR CHILDREN'S WRITTEN RESPONSES WHILE IMAGINING SITUATIONS RELATED TO A DENTAL VISIT

REVISED VERSION

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INSTRUCTIONS

Pages 3, 4, 5 and 6 of the questionnaires provided contain written responses to an imagination task. Subjects were asked to write, in the space provided, what they were thinking while imagining certain situations. This procedure was carried out as part of a larger survey to study dental anxiety among school children aged 9-12 years. Your task is (1) to divide the written material into units and (2) to further classify the content of these units according to two types of categorization.

You have been provided with the following materials:

1. Questionnaires completed by children
2. This Manual - Description of Basic Unit and Categorization of Units
3. Record Forms

Before you begin to select and classify the units, please complete the following steps in the order presented.

1. Read through the instructions given to the children on pages 3, 4, 5 and 6 of any questionnaire. This will give you an idea of the type of tasks given to the children.
2. Read Part 1 of this manual, Description of the basic unit. At this stage, it is only necessary that you gain a general understanding of the procedure. You do not need to remember the details as you will have this manual on hand to refer to. You may skip over the section

entitled "Unusual Cases"; it has been included to assist you should you encounter any difficult cases when going through the questionnaires.

3. Read Part II of this manual, Description of the categorization of units. Again, it is only necessary to gain a basic understanding of the procedure as the manual will be available to refer to.

N.B. Your attention is drawn to the fact that at the end of each part of the manual, space has been provided for "further examples". This is so that you can add other examples which are somewhat different than those listed. This is important, especially in cases where you are unsure of your decision. Please write your example and your coding of it. It will assist in refining the procedures which we are developing.

4. You now have a general idea of how to select out units from the written material and to classify these units according to two types of categorization.

Please look over a record form. Observe that it has been divided into four blocks with headings, "Task #1", "Task #2", "Task #3" and "Task #4". This will allow all unit classifications for a given questionnaire to be recorded on a single record form. The classifications for each individual imagination task will be recorded in the appropriate block.

Within each block are the headings Unit, Mode of Response, Valence of Response. Under "Unit", there are numbers going from 1 to 8; these numbers are to be assigned to each unit as it is selected (ie. the first unit selected

will be called unit 1, the second unit selected will be called unit 2, and so on). It is very doubtful, however, that there will be 8 units for any particular imagination task. When the mode of response of a unit has been determined, the code is to be recorded under the appropriate heading. When the valence of response has been determined, the code is to be recorded under it's heading.

5. Refer to page 35 in Part II of this manual. The codes corresponding to each of Type I and Type II categories, as indicated, are to be used for recording the appropriate categories to which a unit belongs.

6. You may begin to select and classify the units. Please record the questionnaire number in the appropriate space on the record form.

PART I

DESCRIPTION OF BASIC UNIT

Introduction

Part I describes the unit of analysis and the procedure for selecting out units from within the written material. You may find yourself referring to this manual frequently when you begin your task and less often as you become more familiar with the information which it contains.

The table of contents at the beginning of the manual will assist you in referencing specific information. Page 28 also contains a flowchart which illustrates the steps to be taken in determining the units.

The Unit is the Independent Clause

The written material will be divided into units. The Unit is the Independent Clause. An independent clause may take the form of a simple sentence or may be a part of a compound sentence which contains 2 or more independent clauses.

An independent clause or simple sentence consists of one subject (S) and one predicate (P). The predicate contains one main verb and may be followed by one or more of the following predicate parts:

1. Complement (C)
   - says something about the subject.
2. Object (O)
   - is the "Recipient" of the action of the verb.
3. Adverbial (A)
   - modifies the verb.

There are different types of complements, objects and adverbials. However, it isn't necessary to provide any further information about these types as we only need to gain some understanding about the basic form of a sentence.

The following examples are independent clauses which form simple sentences: The letters are codes to indicate the different parts of the sentence.

1. I am bored.
   s v c

2. I would feel scared.
s v c

3. It is going to taste horrible.
s v c

4. I hate it.
s v o

5. It is not going to be too bad.
s v c

6. I hate having fillings.
s v o

7. I can't wait.
s v

8. I would brush my teeth several times before going.
s v o a a

Observe that the main verb may actually be a "verbal phrase" consisting of several words such as "would feel" (example 2) or "is going to taste" (example 3). The verbs "feel" and "taste" are preceded by "auxiliary" or "helping" verbs (i.e. "would" and "is going to", respectively). These helping verbs are used to give the sentence a particular form or meaning.

The relative position of the parts which make up the simple sentence or independent clause is generally:

Subject - verb - object or complement

An adverbial, however, may occur in a number of positions. One such instance may be seen in the following example:

In the dentist's office,	I	feel	scared.
a	s	v	c

Each of subject, verb, object, complement and adverbial may consist of more than one word (i.e. a phrase is often used)

Example: Going to the dentist	is	not much fun.
s	v	c

The Dependent Clause

Not all clauses are independent clauses. There are two types of clauses: one of these is the Independent Clause and the other is the Dependent Clause. We need to know why they are different in order to avoid confusion in selecting our units.

A dependent clause takes the same form as the independent clause (i.e. subject - verb - object, complement and/or adverbial). However, it performs a different function and it begins with any of a set of specific words. A

dependent clause is a constituent part of the main (or independent) clause. It depends upon the main clause for its meaning whereas an independent clause can function alone to form a sentence.

A dependent clause generally begins with any of the following words or "subordinators":

if	so that	unless
because	except that	where
for	that	in case
when	although	while
who	until	which
how	why	after
whereby	as long as	as
like	once	till
since	whenever	wherever
whereas	in order that	as far as
providing that	as soon as	so as
rather than	as if	as though

Dependent clauses may function as subject, object, complement or adverbial in the main or independent clause.

We do <u>not</u> consider a dependent clause to be a unit but a part of a unit.

The following are examples of independent clauses which form simple sentences and which contain one or more dependent clauses within them. The dependent

clause is underlined, and the "subordinator" which introduces the dependent clause is in capital letters.

1. I wouldn't feel worried about it AS LONG AS I knew THAT it was just going to be a normal check-up.
2. I was thinking about HOW it was going to feel.
3. I wonder HOW it's going to be WHEN I go to the dentist tomorrow.
4. I wonder IF it's going to be a check-up.
5. I hate WHEN he clean's my teeth.
6. I feel worried BECAUSE I think it might hurt WHEN I get it done.
7. I wouldn't like it very much BECAUSE it would take up some of my time the following day.

Ellipsis in the Dependent Clause

The following are also independent clauses (or units) which contain one or more dependent clauses. But notice how the first word of the dependent clause (or the "subordinator") is often omitted. This may occur because of grammatical errors or because of ellipsis. (Ellipsis refers to the ommission of words in order to avoid grammatical repetition or redundancy). It is usually very easy to see where they are missing and what the proper form should be. In the case of ellipsis the word can usually be inserted and the sentence remains grammatically accurate.

In the following examples the omitted word is inserted or the form is changed for grammatical accuracy. The dependent clause is underlined.

1. I would hope (that) my teeth were in good condition.

2. I am sure (that) it wouldn't be all that bad.

3. I wonder (if the dentist will) will the dentist be nice tomorrow.

4. I wonder (if it will feel) will it feel funny when he is cleaning my teeth.

5. I wonder (if he will) will he see any bad spots.

6. I hope (that) he doesn't send me to the hospital for a filling.

7. I hope (that) I don't have to get a fluoride treatment.

8. I hope (that) the fluoride doesn't taste too bad because it gives me headaches.

9. I hope (that) he numbs it enough (so that) so the filling doesn't hurt.

10. I wish (that) I didn't have to.

11. I wonder (if I will) will I have to stay in the dentist's office very long.

A Sentence May Contain More Than One Unit

Unlike the cases which we have looked at, some sentences may contain more than one unit (or independent clause). Therefore, we may find two or more units within a single sentence. We determine that a particular part of the sentence is an independent clause on the following basis:

- Independent clauses are joined by either of the three "Coordinators", "and", "or", or "but". Coordinators identify independent clauses whereas

"subordinators" identify dependent clauses.

- A "coordinator" ("and", "or" or "but") may be represented by a comma.

  This happens when there are an indefinite number of independent clauses. The coordinator is usually omitted in all but the final instance where it functions to link more than two clauses. (See #4 in the next set of examples).

- "Neither...nor" and "either...or" also indicate that there is more than one independent clause.

The following examples contain two or more units. The units are underlined and the coordinators are in capital letters.

1. I would not be nervous AND I would stay calm.
2. I don't mind going to the dentist BUT I'm really not crazy about going.
3. I wouldn't mind going to the dentist BUT I wouldn't like to have a filling either.
4. I would be quiet, I would read a magazine AND I would not get upset.
5. It feels funny AND I don't like the taste.
6. He always uses that thing that tickles me AND sometimes I might move around AND he doesn't like that too much.
7. I would NEITHER be happy about going to the dentist NOR would I be upset.
8. I would EITHER be very good at the dentists OR I might move around too much.

Ellipsis in the Independent Clause

Finding independent clauses within a sentence is not always as obvious as in the previous examples. Again, this may be due to ellipsis and/or grammatical errors. In the case of ellipsis, the independent clauses which come after the first independent clause may have the subject omitted or both the subject and "helping" verb omitted. In some instances, part of the verb and the predicate is omitted. Part of the verb will still be visible in the unit. It is often obvious that the subject is expressing two or more different thoughts.

The following examples contain more than one unit. The omitted words have been inserted and the independent clauses (or units) are underlined. The coordinator is in capital letters.

1. I would just sit there in my chair AND (I would) wait until it was my turn AND I would not be nervous.
2. I would feel a little uneasy AND (I would be) wondering what I would have to get done with my teeth.
3. The stuff tastes horrible AND (it or the stuff) gives me headaches.
4. I am afraid that it will hurt AND most of the time, it do (does hurt).
5. I would be nervous AND (I would) want to get started right away.
6. I would sit there very quietly OR (I would) talk to my mother.

Copulas

Units which contain subject complements (ie. the subject complement says something about the subject) contain verbs which are called "copulas" or "linking verbs". These verbs serve only to "link" the complement to the subject. We have already seen units of this type. In the following example, the verb "feel" is a copula:

I feel worried about it.

We focus some attention upon the "copula" or "linking verb" for the following reason. Whenever a sentence contains a linking verb and more than one complement, we consider the sentence to contain more than one unit.

The following verbs are among those which are considered to be copulas. There are others as well (ie. when followed by a complement).

N.B. The words in parenthesis are typical of those which may follow the copula.

be (upset)
appear (happy)
become (older)
feel (annoyed)
come (true)
lie (scattered)
get (ready)
look (sad)

go (sour)

remain (uncertain)

grow (tired)

rest (assured)

fall (sick)

seem (restless)

run (wild)

smell (sweet)

turn (sour)

sound (surprised)

taste (bitter)

The following examples have the linking verb in capital letters and the complements underlined. The sentences are divided into their respective units.

Observe that the complements are joined by coordinators (ie. "and", "or", "but" etc.).

1. I FEEL <u>good about it</u> and <u>very glad to get my teeth clean</u>.

   There are two units:

   - I feel good about it.
   - I feel very glad to get my teeth clean.

2. I would BE <u>a little bit scared</u> and <u>a little bit excited</u>.

   There are two units:

   - I would be a little bit scared.
   - I would be a little bit excited.

3. I would FEEL a little uneasy or a bit scared.

There are two units:

- I would feel a little uneasy.
- I would feel a bit scared.

4. I would BE tense, worried and a bit upset.

There are three units:

- I would be tense.
- I would be worried.
- I would be a bit upset.

5. Checkups are healthy and good for you.

There are two units:

- Checkups are healthy.
- Checkups are good for you.

Coordinators May Perform Other Functions

Up to this point, it appears that we can find our units by simply looking for the sentence "coordinator". Sometimes, however, a coordinator may serve a different function than that of joining two independent clauses.

I. A coordinator may connect two or more dependent clauses.

In the following examples, the dependent clause is underlined (observe that it always begins with a subordinator).

Each of the following forms only one unit. The ellipted subordinator has been inserted.

1. I would be thinking about the stuff which he puts in your mouth and how bitter it would be.

2. I would be thinking about the needle (which) he has to give you and how it would make me sick after I woke up.

3. I would be wondering if I would have to get a filling or if he would say I have to get braces.

II. Sometimes a coordinator may function to join two or more objects (ie. recipient of the action of the verb). In such cases, the coordinator does not define two units.

Examples (objects are underlined and coordinator is in capital letters).

1. I would read a magazine OR cartoon book.
2. I was thinking about a two hour visit AND getting my caps on my teeth again.
3. I would be talking to my mother OR the dentist.
4. I'm used to going to the dentist AND getting my teeth cleaned.

III. Sometimes a coordinator may join two nouns or phrases to create a compound subject. In such cases, the coordinator does not define two units.

Example (compound subject is underlined):

1. My sister and I enjoy going to the dentist.
   (note: instead of "my sister and I", "we" could have been used.)

IV. The case of "or not".

In the following sentences we see "or" followed by "not". They do not indicate a new clause, as they may usually be dropped without producing any change in meaning.

Examples:

1. I wonder will I be afraid <u>or not</u>.
2. I would be wondering if I would have to get a filling <u>or not</u>.

V. Sometimes a coordinator may function to join 2 words or phrases which form a meaning through their joint occurrence. In such cases, the coordinator does not indicate that there are 2 independent clauses.

Following are some examples:

1. I would ask mom to drive me to the dentist and would wait until I was <u>in and out</u>.
   (Note: the first coordinator joins two independent clauses but the second does not. "In" and "Out" often function together to form one meaning as do "up" and "down".)
2. I would be very happy to get my teeth <u>white and clean</u>.
   (Note: "white" and "clean" function together to give a meaning such as "healthy-looking").

Questions or the Interrogative Form

Some units have been written in the interrogative form (ie. questions). When this is the case, units are to be determined in the same manner as outlined previously.

Examples (coordinators are capitalized, units are underlined, and ellipted words are inserted)

1. Oh boy, what's he going to use to clean my teeth this time? (1 unit)
2. Will it be easy OR will he hurt me? (2 units).
3. Am I going to get a filling, (am I going to) get braces on my teetch OR (am I going to) just have a check-up? (3 units)

The basic form of the question is different in that the verb or part of the verb precedes the subject.

Repetition of Instructions

Sometimes a sentence may begin with a phrase or a clause which is worded directly from that which is in the imagination task at the top of the page. In this case, wherever possible, these words, or the phrase or clause is to be treated as though it isn't there. (We will have to note what is written above)

Following are some examples (part of sentence to be omitted is underlined):

1. If I had an appointment tomorrow, I wouldn't really worry about it that day.
2. But I would just say to myself, it won't hurt.
3. I imagined that I was waiting and I wasn't tense at all but of course, it was only my imagination.
4. When I'm in the dentist's waiting room, I'm very very afraid.
5. I would be thinking that it would hurt.
6. When I'm sitting in the dental chair waiting to get my teeth cleaned, I feel a little worried.
7. When I am sitting in the dental chair waiting to get a filling done, I am really really afraid.

N.B. Occasionally you may find that a subject has written a sentence which is directly worded from the task instructions, i.e., "I would be waiting in the dentist's waiting room". (TASK #2) Though it is a sentence, we do not consider it to be a unit since it does not give us any new information.

Unusual Cases

I. It must be realized that as we are dealing with young children, there will be grammatical errors within the writing. For example, subject may be omitted, subject & verb may be omitted, proper punctuation may be missing, etc. Usually, however, it is fairly easy to decide how many units are present and where they are.

Following are examples:

Very happy and relaxed

(2 units - infer that the subject is "I" and verb is a copula.)

Very happy to get my teeth clean

(1 unit - infer that the subject is "I" and verb is a copula).

I would have to

(Sentence has not been completed and we cannot determine any meaning, hence we do not consider this to be a unit.)

I would have to brush my teeth and

(Sentence has not been completed but we can find one unit. The verbal phrase has been completed and is followed by an object.)

Wanted to know what he is going to do

(1 unit - infer that the subject is "I")

Sometimes we may find that a subject has written only a list of adjectives, nouns, or phrases. These are considered to each form one unit.

Examples:

what he will do to my teeth

if he would be nice to me

teeth cleaned

fluoride

needles

frightened

nervous

shaky

scared a little

allergic to the needle

II. The following sentence poses a problem in that one must decide where to place the dependent clause (ie. with which unit).

I would probably feel uneasy/and worried for the fact that it would be my first filling.

We decide that there are two units of the following form:

I would probably feel uneasy for the fact that it would be my first filling.

&

I would probably feel worried for the fact that it would be my first filling.

III. The following sentence is also an unusual case:

Am I going to get a filling, / get braces very soon, / get a needle, / have a tooth pulled / or just go in, / get my teeth cleaned / and come out relaxed.

We divide into units as indicated by the /. Notice that a number of coordinators are indicated by commas.

IV. The following sentences contain 2 units.

My sister enjoys going to the dentist but not me.

Equivalent to:

My sister enjoys going to the dentist but I do not enjoy it.

I would be nervous but not too much.

Equivalent to:

I would be nervous but I would not be too nervous

I would be nervous but not too bad.

Equivalent to:

I would be nervous but I would not be too bad.

V. Interjections are to be ignored and not considered to form units (they are usually followed by the associated units):

Examples:

Oh my gosh!	That's it!
Wow!	Oh brother!
Help!	Oh boy!

VI. The following is considered to contain three units:

What is he going to use? Needles, fluoride?

Equivalent to:

What is he going to use?

Is he going to use needles?

Is he going to use fluoride?

VII. Because of poor grammar, it is sometimes difficult to determine if the second dependent clause is actually a dependent clause or another unit.

Example:

I enjoy going to the dentist because he's nice/and if I had to go to the dentist, I would feel fine.

(Forms 2 units indicated by /. Try inserting subordinator (because) in front of the second "dependent clause" and see if it makes sense. If not, we assume that there is another unit.)

VIII. A subject may write "same as page 2". If so, code the units which the subject has written on page 2.

IX. A subject may use the word "so" which cannot be interpreted as either of the subordinators, "so as" or "so that". It will usually mean "therefore" as in the following and will signify another unit:

It won't be too bad so I'd better sit and be quiet.

Equivalent to 3 units:

It won't be too bad.

Therefore I'd better sit.

Therefore I'd better relax.

X. A subject may write "I would want to know" followed by a list of questions. We do not consider the questions to be individual units but parts of the one unit.

The following are examples which may appear somewhat different than those previously given. When you are in doubt about particular sentences, these may be of assistance:

1. I would feel fine when the dentist finished and gave me a reward and said good-bye.

   1 unit - Equivalent to:

   I would feel fine when the dentist finished and when he gave me a reward and when he said good-bye.

2. I would be thinking and hoping that it will not hurt.

   2 units - Equivalent to:

   I would be thinking that it will not hurt.

   I would be hoping that it will not hurt.

3. I would feel fine waiting to get my tooth pulled, get my checkup, get my toothbrush.

   1 unit - Insert "while" between "fine" and "waiting".

4. He might be giving me a needle to get rid of the pain/and be ready to give me a filling.

   2 units - indicated by /

   (i.e., He might be ready to .....)

5. This is a good place to watch other children, funny and noisy.

3 units - Equivalent to:

This is a good place to watch other children.

It is funny.

It is noisy.

6. I would feel upset but not enough to cry.

2 units - Equivalent to:

I would feel upset.

I would not feel upset enough to cry.

7. I won't get upset because my dentist is kind and gentle.

1 unit - "kind and gentle" are complements within the dependent clause, not within the main clause.

8. I'd have to leave,/I'd be that upset.

2 units - indicated by /

9. I wish he'd hurry up and finish it.

1 unit - Equivalent to:

I wish that he'd hurry up and that he'd finish it.

10. I would cry and cry.

1 unit - Equivalent to:

I would cry a lot.

11. I would like a fluoride treatment and not a filling.

2 units - Equivalent to:

I would like a fluoride treatment.

I would not like a filling.

12. A needle, I got to get out of here.

2 units - Equivalent to:

It's a needle.

I got to get out of here.

13. I was sitting there feeling very sick.

2 units - Equivalent to:

I was sitting there.

I was feeling very sick.

Outline of Procedure

Figure 1 (next page) contains a flowchart which is similar to those used in developing computer programs. It illustrates the logical process of dividing written material into units. Simply start at the top of the page and follow the arrows. Questions or decisions to be made are contained inside black boxes while actions to be taken are contained inside red boxes. Initially, you may need to refer to sections of the manual to answer a question or make a decision.

N.B. This flowchart will not be applicable when a subject has not used sentences. In such an instance, please refer to the section entitled "Unusual Cases".

Look at a sentence (ie. ending with a period.
Does sentence contain any repetition of instructions?
Yes
Cross out part which has been repeated.
No
Are there any coordinators present (ie. and, or, but, either..or, neither..nor)?
No
Note that there is only one unit.
Yes
Are there any grammatical errors or ellipted words?
Yes
Put in omitted words and/or correct grammatics.
No
Do the coordinators join independent clauses or subject complements?
No
Note that there is only one unit.
Yes
Determine how many units there are.
Yes
Are there any more sentences?
No
All units have been found for this imagination task.

The procedure outlined in the flowchart may be summarized as follows:

Look at a sentence which the subject has written. Determine if any part of the instructions have been repeated. If so, cross out this part of the sentence. Determine if there are any coordinators present. If there are none, note that the sentence contains only one unit and move on to the next sentence.

If coordinators are present, determine first if there are ellipsis or any grammatical errors and make the necessary corrections (ie. put in the omitted words or correct the grammatics). Next, determine if the coordinators join independent clauses or subject complements. If they do not, note that there is only one unit. Else, decide upon the number of units which the sentence contains.

If there are any sentences remaining, repeat this process for each one until all units have been found.

Further Examples:

PART II

DESCRIPTION OF THE CATEGORIZATION OF UNITS

Introduction

The units are to be classified based on two types of categorization. Type I is referred to as the Mode of Response. Type II is referred to as the Valence of Response.

Type I or the mode of response refers to the manner or channel in which the subject has chosen to respond. A unit may belong to either of four categories within this level. These are listed below. Observe that two of the categories have been further subdivided.

1. Active/Motoric - reference is made to some physical action which the subject would (or would not) be performing.
2. Cognitive - reference is made to the subject's thoughts or to mental processes which he/she would (or would not) be carrying out.

A Cognitive unit is classified as either of two types:

2.1 Cognitive-Uncertain - uncertainty is indicated in the subject's thoughts or expectations regarding the dental visit.

2.2 Cognitive-Certain - there is no indication of uncertainty in the subject's thoughts or expectations regarding the visit.

3. Feeling - reference is made to a feeling (or feelings) which the subject would (or would not) be experiencing.

A feeling unit is classified as either of two types:

3.1 Feeling-Bodily - the feelings are specifically bodily or physical ones.

3.2 Feeling-Non-Bodily - the feelings are not specifically bodily ones. These are, generally, emotional feelings.

4. Unclassifiable - this category has been included for those units which are problematic (ie. difficult to interpret meaning because of poor spelling, writing, etc.)

Type II or the valence of response refers to whether the response is a positive, neutral or negative one. There are nine categories within this level. These are:

1. Positive - the response is positive in relation to the dental visit.
2. Positive-Conditional - the response is positive but is contingent upon some condition.
3. Positive-Not Negative - the response is considered to be positive in that it is "not negative".
4. Positive-Not Negative-Conditional - the response is Positive-Not Negative but is contingent upon some condition.
5. Neutral - the response cannot be classified as either positive or negative.
6. Negative - the response is negative in relation to the dental visit.
7. Negative-Conditional - the response is negative but is contingent upon some condition.

8. Negative-Not Positive - the response is considered to be negative in that it is "not positive".
9. Negative-Not Positive-Conditional - the response is Negative-Not Positive but is contingent upon some condition.

The Type I and Type II categories are explained further in this manual, according to the following format:

A Type I (ie. "Mode of Response") category is described and examples are provided. There follows a description of all Type II (ie. "Valence of Response") categories as they pertain to the particular Type I category. This pattern is repeated for all Type I categories, except "unclassifiable" where units will not be classified according to valence. The Type II categories are described three times so that we can see how the valence is determined in units with different response modes.

It may be necessary to refer to this manual frequently in the initial stages of classifying the units. The "Table of Contents" will be of assistance when looking for specific information. The next page also contains an outline of the Type I and Type II categories with the corresponding codes which will be used for recording purposes. A diagram, on page 64 of this manual, illustrates the steps to be taken in classifying the units.

Type I and Type II Categories With Codes

Type I - Mode of Response	Type II - Valence of Response
Code	Code
1. Active/Motoric	1. Positive
	2. Positive - Conditional
Cognitive	3. Positive - Not Negative
2.1 Uncertain	4. Positive - Not Negative - Conditional
2.2 Certain	5. Neutral
	6. Negative
Feeling	7. Negative - Conditional
3.1 Bodily	8. Negative - Not Positive
3.2 Non-Bodily	9. Negative - Not Positive - Conditional
4. Unclassifiable	

1. Active/Motoric Units

These are units in which the subject refers to some physical action which he/she would (or would not be) performing. The subject does not state what his/her thoughts or feelings are.

Such units usually contain verbs of action as can be seen in the following examples (action verbs are underlined):

1. I would just sit down.
2. I would read a magazine or cartoon book.
3. I would brush my teeth several times before going.
4. I would ask mom to drive me to the dentist.
5. I would wait until it was my turn.
6. I might move around too much.
7. I'll have to go to the dentist to get my teeth cleaned.

Valence of Active/Motoric Units

This section describes the Type II or valence categories as they pertain to the active/motoric units. Each unit is classified under one of the following:

Positive: The action(s) indicated are positive in relation to the dental visit. The subject may be making positive preparation for the visit; using

~~on which would indica~~

that he/she isn't thinking or worrying about the visit); performing some

action which would suggest that he/she is coping positively with the situation; etc.

Examples:

1. I would brush my teeth several times before going. (Positive preparation)
2. I would read a magazine or cartoon book. (Distraction)
3. I would talk to my mother while I was waiting. (Distraction)
4. I would behave myself at the dentists. (Positive Coping)
5. I am looking at posters. (Distraction)
6. I am looking around at the other children. (Distraction)

Positive-Conditional: The subject refers to some positive action but states that the action is contingent upon some condition(s) existing. Such a unit will usually contain a dependent clause beginning with "if" or "as long as". This can be seen in the following examples (condition is underlined):

1. As long as it was just going to be a check-up, I would behave myself.
2. If I knew that it wasn't going to hurt, I would chat to the dentist.
3. If my girlfriend was there, I would joke with her.

Positive-Not Negative: The subject indicates that he/she would "not" be performing a particular "negative" action.

Examples: ("not" and the "negative" action are underlined):

1. I would not move around a lot.
2. I would not cry.

3. I wouldn't hit the dentist.

Positive-Not Negative-Conditional: The subject indicates that he/she would "not" be performing a particular "negative" action "if" or "as long as" a certain condition exists.

Examples (condition is underlined):

1. I would not move around a lot if I knew that it wasn't going to hurt.
2. I would not cry as long as I didn't have to get a needle.

Neutral: The unit refers to an action which cannot be considered either positive or negative.

Examples (action is underlined):

1. I would just sit there.
2. I would ask mom to drive me to the dentist.
3. I would wait until it was my turn.

Negative: The actions indicated are negative in that they would make the dental visit into an unpleasant experience.

Examples (negative action is underlined):

1. I would cry.
2. I would move around a lot.

3. I would shout at the dentist.

4. I'm going to leave.

Negative-Conditional: The subject indicates that he/she would be performing some "negative" action dependent upon whether a particular condition exists.

Examples (condition is underlined):

1. I would cry if I had to get a filling.
2. I would hit him if he hurt me.
3. If he said that I would have to get braces, I would run out of the office.

Negative-Not Positive: The subject indicates that he/she would "not" be performing a given "positive" action.

Examples ("not" and "positive" action are underlined):

1. I would not smile at the dentist.
2. I would not behave myself very well.

Negative-Not Positive-Conditional: The subject indicates that he/she would "not" be performing some "positive" action dependent upon whether a particular condition exists.

Examples (Condition is underlined):

1. I would not behave myself at the dentist if I knew he was going to hurt me.

2. I would not talk to the dentist <u>if he wasn't nice to me</u>.

2. Cognitive Units

Units are classified as cognitive if the subject has responded by indicating what his/her thoughts would be (ie. thoughts about visit being good or bad, thoughts about some aspects of visit) or by making reference to some mental process such as thinking, hoping, wondering, or worrying.

Cognitive units are classified as either of two types.

2.1 Cognitive-Uncertain

The subject's response suggests that there is some uncertainty with regard to his/her knowledge of the dental visit or with regard to his/her expectations or thoughts about it. This uncertainty is indicated when the subject states that he/she would be "hoping", "wondering", "wanting to know", "feeling worried about", by words such as "perhaps", "maybe", "might", or "probably", or when the unit takes the form of a question.

Examples (indicator of uncertainty is underlined):

1. I would <u>hope</u> that I have no cavities.
2. I would <u>hope</u> that my teeth were in good condition.
3. I would <u>be wondering</u> if I would have to get a filling or not.
4. I would <u>be wondering</u> if I would have to get braces.
5. What's he going to use to clean my teeth this time?
6. I <u>wonder</u> how it's going to be when I go to the dentist tomorrow.

7. Maybe I won't be there very long.
8. I wanted to know what he is going to do.
9. Is he going to hurt me?
10. I might be a little nervous.
11. I feel a little worried about it.
12. He will probably be nice to me.

2.2 Cognitive-Certain

There are cognitive units in which the subject does not indicate uncertainty regarding his/her knowledge or expectations of the visit (ie. those units which cannot be classified as "uncertain"). In most of these, the subject appears to have some knowledge of the visit or some clear expectation of how it will be or how he/she will be thinking about it.

Examples:

1. I'm sure it wouldn't be all that bad.
2. I wouldn't be worried.
3. I wouldn't worry about it today.
4. It isn't going to be too bad.
5. I wouldn't mind because I'm used to that.
6. It was only my imagination. (N.B. in reference to something previously said)
7. I would want to go home to relax.
8. It isn't going to be easy.

9. I was thinking about the thing that makes a buzzing noise.
10. He doesn't like that too much.
11. I wish I didn't have to.
12. I would want to get started right away.
13. I can't wait.
14. I was thinking about a two hour visit getting my caps on my teeth again.
15. I was thinking about how it was going to be.

Valence of Cognitive Units

Each cognitive unit is further classified among the "Type II" or "Valence" categories. These categories are described below as they apply to cognitive units, and examples are given for each of the cognitive-uncertain and cognitive-certain types. Each cognitive unit will be classified among one of these categories.

Positive: The subject makes reference to something positive about the dental visit or indicates that he/she would be thinking positively about it.

Examples (positive indicator is underlined):

1. I would hope that my check-up goes well.
2. I wonder will the dentist be nice today.
3. I would hope that my teeth were in good condition.

Cognitive - Uncertain

4. It is healthy to have good teeth.
5. The dentist always gives me a new toothbrush.

Cognitive - Certain

6. I look forward to going to the dentist.

Positive-Conditional: The subject's response indicates that he/she would be thinking positively "if" or "as long as" a particular condition exists.

Examples (condition is underlined):

N.B. Examples have not been found for "Cognitive-Uncertain" units. We do not rule out the possibility, however, that there are such cases.

1. As long as I didn't have to get a tooth pulled, I would look forward to it.
2. If it was only a check-up, I think that it would be fun.

Cognitive - Certain

Positive-Not Negative: In these units, there is no direct positive reference. Instead, he/she uses the form of "not negative". The subject indicates that his/her thoughts would "not" be "negative" or makes reference to the absence of something negative.

Examples ("not negative" and "absence of negative" indicators are underlined):

1. I would hope that I have no cavities.
2. I would hope that I do not have to get a filling.
3. I would want to know that the dentist would not hurt me.

Cognitive - Uncertain

4. I am sure it wouldn't be too bad.
5. I wouldn't feel worried.
6. I wouldn't mind because I'm used to it.

Cognitive - Certain

Positive-Not Negative-Conditional: These are units in which the subject responds in a "not negative" form as described previously but includes an "if" or "as long as" condition as was also described previously.

Examples ("condition" and "not negative" parts are underlined):

1. If I knew I had to get a filling, I would be hoping that it wouldn't hurt.
2. If it was going to be a fluoride treatment, I would want to know that it wasn't painful.

Cognitive - Uncertain

3. As long as it was just a check-up, I would not be worried.
4. If I didn't have to get a filling, I think that it wouldn't be too bad.

Cognitive - Certain

Neutral: The subject's response cannot be classified as either positive or negative. This is the case when we cannot determine how a response is intended (ie. positive or negative, example #7) or when the subject makes no such reference one way or the other.

Examples:

1. I would be wondering if I would have to get a filling.
2. I would be wondering if I would have to get braces. — Cognitive – Uncertain
3. What's he going to use to clean my teeth this time?
4. I wanted to know what he is going to do.

5. I was thinking about the thing that makes a bussing noise.
6. I was thinking about a two hour visit getting my caps on my teeth again. — Cognitive – Certain
7. I can't wait.
8. I would want to get started right away.

Negative: These units indicate that the subject is having negative or unpleasant thoughts about the dental visit or some aspect of it.

Examples:

1. Is it going to hurt?
2. I would be very worried. — Cognitive – Uncertain
3. I wonder will I be afraid or not.

4. I would want to go home to relax.
5. It was only my imagination. — Cognitive – Certain
   (N.B. in cases where the subject was previously referring to something positive)

Negative-Conditional: The subject makes reference to some negative thought or thought process which is contingent upon some condition.

Examples (condition is underlined):

1. If I had to get a filling, I would be wondering if it would hurt. — Cognitive - Uncertain
2. If he said I had to get braces, I would be worried about looking funny.

3. I would want it to be over quickly if I had to get a tooth pulled. — Cognitive-- Certain
4. If I had to get a filling, I would wish that I was somewhere else.

Negative - Not Positive: The subject does not directly refer to something which is negative or as being negative. Instead, he/she uses the form of "not positive". The subject indicates that his/her thoughts would "not" be "positive" or makes reference to something as "not" being "positive".

Examples ("not positive" parts are underlined):

N.B. no examples of "Cognitive-Uncertain" units have been found. However, it may be possible that there are such cases.

1. It will not be very nice.
2. It isn't going to be easy.
3. He doesn't like that too much.

Cognitive-Certain

Negative - Not Positive - Conditional: The subject responds by using the "not positive" form as previously described but imposes a condition.

Examples ("condition" and "not negative" parts are underlined):

N.B. No examples of "Cognitive Uncertain" units have been found.

1. If I have to get a filling, the visit will not be very nice.
2. It isn't going to be easy if I have to get a tooth pulled.

Cognitive-Certain

3. Feeling Units

In these units, the subject indicates that he/she would (or would not) be experiencing some specific or general feeling(s). Websters New World Dictionary defines feelings as "subjective reactions, pleasurable or unpleasurable that one may have to a situation and usually connotes an absence of reasoning". The examples provided in this section illustrate what some of these feelings may be.

"Feeling" units are classified as either of two types.

3.1 Bodily

The feeling indicated is a physical or physiological one. It may be a distinct physical sensation (ie. "tastes bad", "smells awful") or a generalized bodily feeling (ie. "relaxed", "tense").

Examples (physical feeling is underlined):

1. I would be very relaxed.
2. It won't hurt.
3. I would feel shaky.
4. It feels funny.
5. My mouth would be numb if I had a needle.
6. It is going to taste horrible.
7. It gives me headaches.
8. I would not be tense.
9. I would feel very relaxed.
10. I am allergic to the needle.

    (Note: classify as physical since "allergy" implies a physical bodily reaction.)

3.2 Non-Bodily

"Feeling" units are classified as "non-bodily" if they do not specifically refer to bodily feelings or sensations. These "non-bodily" feelings are generally emotional ones. Websters New World Dictionary defines emotions as "complex reactions which have both mental and physical manifestations"

(ie. love, hate, fear, anger). However, the unit does not indicate what these manifestations are; it simply refers to the feeling (or emotion).

Examples (feeling is underlined):

1. I would not be nervous.
2. I would be very happy to get my teeth clean.
3. I feel good about it.
4. I would be glad to go to the dentist.
5. I would stay calm.
6. I would feel a little bit excited.
7. I would be excited.
8. I feel bored.
9. I would be a little uneasy about it.
10. I would be frightened.
11. I am afraid of getting my tooth pulled.
12. I enjoy getting my teeth clean.
13. I don't like getting fillings.
14. I am not crazy about having to go to the dentist.
15. I hate fluoride treatments.

Notes

A. There are units which take the form of "I feel good" or "It feels good". The former case would generally be classified as "non-bodily" as we can infer that it is an emotional type of feeling. The latter case, however, would depend upon the context in which it is written. In the following two units,

example 1 would be classified as "non-bodily" while example 2 would be classified as "bodily".

1. It feels good to have clean, healthy teeth.
2. It feels good when he is cleaning my teeth.

B. Some units make reference to a feeling without the subject directly stating that he/she would (or would not) be experiencing that feeling. Such units are often cognitive ones in which the subject may be wondering or worrying about whether he/she would be experiencing a given feeling. These types are not classified as "feeling" units.

Examples:

1. I wonder if it will hurt.
2. I would worry that it might make me sick.

C. The following statement is classified as "feeling-non-bodily"

I am afraid that it will hurt.

The subject indicates that he/she would be afraid that it will hurt; he/she however, is not saying that it will hurt.

Valence of Feeling Units

This section describes the "Valence" or "Type II" categories as they pertain to units which are classified as "Feeling".

Examples are given for each of "Bodily" and Non-Bodily" types.

Each feeling unit is classified among one of the following categories.

Positive: The feelings are positive ones which the subject has toward the dental visit or some aspect of it.

Examples (positive feeling is underlined):

1. I feel relaxed.
2. It feels good when he cleans my teeth. Bodily
3. It tastes nice.

4. I am happy about going to the dentist.
5. I would feel a little bit excited.
6. I would be calm. Non-Bodily
7. I enjoy getting my teeth clean.
8. I would feel good about it.

Positive-Conditional: The subject indicates that he/she would be experiencing a particular positive feeling "if" or "as long as" some condition exists.

Examples (condition is underlined):

1. It would feel nice if I was just getting my teeth cleaned.
2. I would be very relaxed if I didn't have to get a filling. Bodily

3. As long as I knew it was only going to be a check-up, I would feel fine. Non-Bodily

Positive - Not Negative: In these units, the subject indicates that he/she would "not" be experiencing a particular "negative" feeling.

Examples ("not" and "negative" feeling are underlined):

1. It will not hurt.
2. I would not be tense. Bodily
3. It would not taste bad.
4. It would not make me sick.

6. I would not be nervous.
7. I would not get upset. Non-Bodily
8. I wouldn't feel frightened.

Positive - Not Negative - Conditional: The subject indicates that he/she would not be experiencing a given negative feeling "if" or "as long as" a certain condition exists.

Examples ("not negative" and "condition" parts of the unit are underlined):

1. I would not be tense if it was only a check-up.
2. I would not get sick as long as I didn't have to get a filling. Bodily

3. I wouldn't be scared if I knew it wasn't going to hurt.

4. I would not be nervous as long as I didn't have to get a tooth pulled. Non-Bodily

Neutral: The subject states that he/she has no particular feelings about the visit, or the feeling stated cannot be inferred to be positive or negative.

Examples:

1. It makes my mouth feel numb.

2. It tickles. Bodily

3. It feels funny.

4. I feel funny about it.

5. I have no particular feelings about it. Non-Bodily

Negative: The subject indicates that he/she would be experiencing negative or unpleasant feelings.

Examples (feeling is underlined):

1. The needle is going to hurt.

2. I would feel very shaky.

3. The stuff tastes horrible. Bodily

4. It gives me headaches.

5. I am feeling tense.

6. I would feel nervous about it.

7. I would be very upset.

8. I feel bored. Non-Bodily

9. I am frightened about getting a filling.

10. I feel a little uneasy about it.

11. I hate the drill that he uses.

Negative-Conditional: The subject indicates that he/she would be experiencing some negative feeling depending upon whether a particular condition exists.

Examples (condition is underlined):

1. I would feel shaky if I had to get a tooth pulled. Bodily

2. I would be tense if I had to get a filling.

3. I would feel nervous if I had to get a fluoride treatment. Non-Bodily

4. I would feel awful if he said I would have to get braces.

Negative - Not Positive: The subject indicates that he/she would not be experiencing a particular positive feeling.

Example: ("not" and "positive" feeling are underlined):

1. The drill would not feel very nice. Bodily
2. It would not taste very good.

3. I would not be happy about it.
4. I would not feel good about it. Non-Bodily
5. I am not crazy about it.

Negative - Not Positive - Conditional: The subject indicates that he/she would "not" be experiencing some "positive" feeling depending upon whether a particular condition exists.

Examples ("not negative" and "condition" parts of sentence are underlined):

1. I would not be relaxed if I knew it might hurt. Bodily

2. I would not feel very calm if I had to get a fluoride treatment. Non-Bodily
3. I wouldn't be too excited about it if I were getting a tooth pulled.

Unclassifiable Units

A unit is placed in this category if it cannot be classified with either of the "Active/Motoric", "Cognitive", or "Feeling" response modes. This will be the case when the unit contains words which are misspelled, illegible writing, etc. such that it is not possible to determine a meaning.

Unusual Cases

I. Occasionally, we may encounter units which contain more than one of the response mode categories (ie. cognitive, feeling, action) as in the following example:

I would just sit there calmly.

We know that the subject would be performing an action (sitting) and experiencing a particular feeling (ie. calm).

Even though there is only one unit, we classify it as though there were two, ie. 1. I would just sit there. 2. I would be calm.

The first unit, would be classified as active/motoric with neutral valence. The second would be classified as feeling-non-bodily with positive valence.

II. The way in which a subject indicates his/her feelings may vary from one subject to another.

Examples:

1. I would be thinking about how I would be upset. (Non-Bodily - Negative)
2. The dentist won't hurt me with the needle. (Bodily - Positive-Not Negative)
3. I see myself as being upset. (Non-Bodily - Negative)
4. I love the flavour. (Non-Bodily - Positive)
5. That's enjoyable. (Non-Bodily - Positive)
6. I would be nervous in my stomach. (In this instance, we code

"nervous" as Bodily since it is obvious that the subject is referring to a physical feeling. The valence is Negative.)

7. I would be anxious to get in. (Non-Bodily - Neutral - we do not know whether "anxious" is meant to be positive or negative).
8. Unhappy because I'd miss school. (Non-Bodily - Negative)
9. The bad part is the butterflies and pain. (Bodily - Negative)

III. Other words which indicate feelings include the following:

edgy (Non-Bodily - Negative)
jumpy (Bodily - Negative)
brave (Non-Bodily - Positive)
butterflies (Bodily - Negative)
uptight (Bodily - Negative)
hyper (Bodily - Negative)
empty (i.e., "I would feel empty", Non-Bodily - Neutral)

IV. A subject will sometimes write words in a form which is not correct.

i.e. un nervous = not nervous (Positive - Not Negative)
un relaxed = not relaxed (Negative - Not Positive)

V. A "conditional" unit will sometimes be indicated differently from that which was previously described.

Examples:

1. When it's over, I'll be glad.
2. I would feel fine until he gave me a needle.

These indicate what the subjects feelings would be at a particular point in time and not necessarily throughout the situation described.

VI. Some units may appear to be Feeling units but are actually Cognitive units. The subject may refer to particular feelings without saying that he/she would be experiencing them. There may be reference to feelings about previous visits, feelings which he/she would like to be having, or feelings which he/she <u>might</u> be having.

Examples:

1. I would tell myself to calm down. (Cognitive-Certain - Positive)
2. I should calm down. (Cognitive-Certain - Positive)
3. It didn't pain when I had it done before. (Cognitive-Certain - Positive-Not Negative)
4. Usually, I am not afraid. (Cognitive-Certain - Positive-Not Negative)
5. Most of the time, I am nervous. (Cognitive-Certain - Negative)
6. I might get sick. (Cognitive-Uncertain - Negative)
7. Maybe I'll feel alright. (Cognitive-Uncertain - Positive)

VII. Active units refer to those units in which the <u>subject</u> is (or isn't) performing some action. The following unit would <u>not</u> be considered Active:

The dentist is putting a needle in my mouth.
(Cognitive-Certain - Neutral)

VIII. A number of Active units begin with "I would ask" or "I would say." Valence is determined by what the subject is asking or saying.

Examples (Valence is given):

I would ask him if he was going to give me a needle. (Neutral)

I would ask my sister how it feels. (Neutral)

I would tell the dentist to speed it up. (Negative)

I would tell him that I didn't want to get it done. (Negative - Not Positive)

I would ask mom if I could stay home. (Negative)

I would ask if it was going to pain. (Negative)

I would ask if the fluoride would taste nice. (Positive)

IX. Some units may appear to be Active but are actually Cognitive in that the subject doesn't say whether or not he/she will carry out the action.

Examples:

1. I could run out of here.
2. I could scream.
3. I felt like running away.
4. Maybe I'll hit the dentist.

X. Some units begin with "I feel like" or "I would like to" but are actually Cognitive units instead of Feeling units. We can infer that the subject is saying "I would want to".

Examples:

1. I feel like leaving. (Cognitive-Certain - Negative)
2. I feel like telling him to leave me alone. (Cognitive-Certain - Negative)
3. I don't feel like going in. (Cognitive-Certain - Negative-Not Positive)

XI. Some indicators of Cognitive-Uncertain units, different from those previously mentioned can be seen in the following units:

1. I was thinking if it would pain or not. (Can infer that the subject is "wondering about")
2. I was trying to remember what it was like.
3. I am trying not to get upset.
4. It seems like I don't like him.
5. I suppose it will be alright.
6. I am curious about how it will be.
7. I guess he won't hurt me.

XII. Some units make reference to dental procedures, tools, etc. Usually, if the subject makes no negative or positive reference, these are considered to have Neutral valence. Examples 4 and 6 are exceptions for obvious reasons.

Examples:

1. I'll have to get a tooth pulled. (Cognitive-Certain)
2. Will I need a filling? (Cognitive-Uncertain)

3. How many cavities will I have? (Cognitive-Uncertain)

4. He'll have to take all of my teeth out. (Cognitive-Certain - Negative)

5. I wonder what flavour of fluoride he'll use? (Cognitive-Uncertain)

6. I'll probably have 10 or 15 cavities. (Cognitive-Uncertain - Negative)

XIII. When a unit begins with "I would hope" the valence is usually Positive or Positive-Not Negative as in the following examples:

1. I hope he gives me a toothbrush. (Positive)

2. I hope I don't have any cavities (Positive-Not Negative)

3. I hope he pulls out my bad tooth. (Positive)

4. I hope he doesn't hurt me. (Positive-Not Negative)

(N.B. The subject is hoping for some Positive or Positive-Not Negative outcome)

Units of this type (ie. "I would hope") with Neutral Valence usually refer to something other than the dental visit, or we cannot determine for certain a negative or positive reference.

Examples:

1. I hope I miss Math.

2. I hope I don't miss skating.

3. I hope he doesn't take a long time.

Units with Negative or Negative-Not Positive Valence are typified in the

following examples (we can tell that the subject does not have a positive attitude toward the dental visit.)

1. I hope he hurries it up so I can get out of here. (Negative)
2. I hope I'm not the first to go in. (Negative - Not Positive)
3. I hope it's over fast. (Negative)

XIV. Units of the following forms are to be considered Unclassifiable:

fluoride
needles
pain
teeth cleaned
cavities

We cannot infer a meaning from them. In the following units, however, we can infer that "I would" forms the beginning of the sentence:

get dressed
go to the dentist
brush my teeth

Some other unusual cases are listed below with Type 1 and Type 2 categories indicated.

1. I can't wait till this visit is through. (Cognitive-Certain - Negative-Not Positive)
2. I'll pretend I'm dreaming. (Cognitive-Certain - Neutral)

3. It's only like everything else you have to do. (Cognitive-Certain - Positive)
4. There's nothing to be upset about. (Cognitive-Certain - Positive-Not Negative)
5. I wonder what I did to deserve this. (Cognitive-Uncertain - Neutral)
6. I'll have to get a filling even if I don't want it. (Cognitive-Certain - Negative)
7. If I have to get a filling, think about something else. (Cognitive-Certain - Positive-Conditional)
8. I'd be interested in what he was putting in my mouth. (Cognitive-Certain - Neutral)
9. I don't need to go very often because my teeth are in good condition. (Cognitive-Certain - Positive)
10. I wish my teeth would have nothing wrong forever. (Cognitive-Certain - Neutral)
11. I don't care about whether I go or not. (Cognitive-Certain - Neutral)
12. Good because I can miss school for a day. (Cognitive-Certain - Positive)
13. My dog's name is Blacky. (Unclassifiable)
14. I would look at the time. (Active - Neutral)
15. I would fall asleep. (Active - Neutral)

Steps of the Classification Process

The following diagram illustrates the steps to be taken in classifying the units. Decisions to be made are in black boxes while actions to be taken are in red boxes. Simply follow the arrows.

Select Unit
What is the mode of response of unit?
Active
Unclassifiable
Cognitive
Feeling
Is unit cognitive-certain or cognitive-uncertain?
Is unit feeling-bodily or feeling-non-bodily?
Record corresponding code in appropriate place on record form.
Is the mode of response "unclassifiable"?
Yes
No
What is the valence of unit?
Record corresponding code in appropriate place on record form.
Go to next unit and repeat process.

Steps to be taken in classifying the units may be summarized as follows:

Start by selecting a unit. Determine what is its' mode of response. If the mode of response is unclassifiable then

- record the corresponding code.
- go to the next unit and begin again.

If the mode of response is active/motoric then

- record the corresponding code.
- determine the valence of response and record the corresponding code.
- go to the next unit and begin again.

If the mode of response is cognitive then

- determine if it is cognitive-uncertain or cognitive-certain and record the corresponding code.
- determine the valence of response and record the corresponding code.
- go to the next unit and begin again.

If the mode of response is feeling then

- determine if it is feeling-bodily or feeling-non-bodily and record the corresponding code.
- determine the valence of response and record the corresponding code.
- go to the next unit and begin again.

Further Examples:

APPENDIX C

Record Form

RECORD FORM

Questionnaire # _____

Task #1

Unit	Mode of Response (Type 1)	Valence of Response (Type 2)
1		
2		
3		
4		
5		
6		
7		
8		

Task #2

Unit	Mode of Response (Type 1)	Valence of Response (Type 2)
1		
2		
3		
4		
5		
6		
7		
8		

Task #3

Unit	Mode of Response (Type 1)	Valence of Response (Type 2)
1		
2		
3		
4		
5		
6		
7		
8		

Task #4

Unit	Mode of Response (Type 1)	Valence of Response (Type 2)
1		
2		
3		
4		
5		
6		
7		
8		

APPENDIX D

Mean Percentage of Units Assigned to Mode of Responding Categories by Age Group

Mean percentage of units assigned to mode of responding categories by age group.

Age Group	Active/, Motoric	Cognitive	Feeling
9 yrs., 11 mos. and younger	13.25	40.91	44.53
10 yrs. to 10 yrs., 11 mos.	8.22	51.22	38.52
11 yrs. to 11 yrs., 11 mos.	8.66	51.08	38.95
12 yrs. and older	5.74	61.50	32.62