A FACTOR ANALYTIC STUDY OF MANIFEST ANXIETY
AND ABSTRACT-CONCRETE WORD RECALL

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The study included 96 psychology undergraduate volunteers at the Kansas State Teacher's College. After being assigned at random to abstract and concrete word treatment conditions, a word association task was completed. Then the Taylor Manifest Anxiety Scale was administered. A factor analysis was performed upon the results yielding 15 factors related to anxiety and one factor related to memory: (1) General Apprehension; (2) Perceived Self Effectiveness; (3) Abstract Recall and Situational Incongruity vs. Concrete Recall and Anxious Incongruity; (4) Lack of Self Confidence vs. Self Confidence; (5) Emotional Reaction; (6) Hypochondriasis; (7) Social Confidence; (8) Restless Behavior vs. Complacency; (9) Driven Determination; (10) Compensatory Self Confidence; (11) Emotional Control vs. Emotional Unconstraint; (12) Fear of Emotional Release vs. Emotional Release; (13) Emotional Sensitivity; (14) Nervous Inattention vs. Concentration; (15) Emotional Instability vs. Emotional Stability; (16) Nervous Release.
Methods and experimental situations have varied in studies that have been designed to determine whether or not anxiety prevents recall. Stimuli to be recalled have ranged from pictures and words to digits and nonsense syllables. For example, Kaye, et. al. (9) used a combination of mixed letters and words. Bush pointed out in his dissertation (2) that experimental procedures to control for anxiety have varied as well. Some experimenters have selected subjects on the basis of obtained anxiety scores on a particular scale. Others have attempted to induce anxiety by means of a particular experimental procedure.

The results of these experiments have been inconsistent. Bush's criticism that such inconsistencies have been due to lack of experimental controls is valid. However, another reason could help explain the inconsistent results. Underlying anxiety-memory dynamics have not been identified in experiments designed to study the effects of anxiety on memory. If this were done, we may better understand under what memory conditions certain anxiety variables operate.

Another problem towards which this study was aimed is the old question of what is anxiety. Cattell and Scheier (6) demonstrated that the many measures of anxiety do not necessarily measure the same thing. It was the interest of this study to examine the components of the Taylor Manifest Anxiety Scale, factor analytically, to uncover what factors comprise that measure of anxiety.

Our study, then, was an exploratory one, in which we attempted to uncover, with factor analytic methods, anxiety-memory relationships, if they existed, in two abstract-concrete word treatment conditions. Also, we intended to see if the items on the
Taylor Manifest Anxiety Scale could be grouped into factors which might represent the components of anxiety which the test purports to measure.

**Method**

**Instrument**

The Taylor Manifest Anxiety Scale (10), a word association task (6) and a recall task were administered. The association task required grouping abstract and concrete words, thirty words of each. Decision as to the kinds of words used was based on the following operational definitions: Abstract words were defined as words that represent concepts of which a picture could not be

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<th>Table 1</th>
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<tr>
<td><strong>List of Words</strong></td>
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<tr>
<td><strong>Abstract Words</strong></td>
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<tr>
<td>altitude, cold, compromise.</td>
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<tr>
<td>confused, depressed, excitement</td>
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<td>fear, freedom, happy</td>
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<td>hate, hope, hunger</td>
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<td>important, irritate, kind</td>
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<td>lost, love, low</td>
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<td>melancholy, mourn, myself</td>
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<td>natural, opportunity, pain</td>
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<td>passion, power, proud</td>
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<td>seek, warm, valuable</td>
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drawn, such as hope, irritate and passion. Concrete words were defined as the opposite, i.e., words of which a picture could be easily drawn, such as pencil, shoes and dog. The recall portion of the experiment was simply to write on a piece of paper the words that were grouped two days after the association task was completed.

Subjects

The Ss for the experiment were 110 volunteer undergraduate students in psychology classes at the Kansas State Teacher's College, Emporia, Kansas. The Ss were assigned at random to abstract and concrete word conditions.

Procedure

The Ss were instructed to place on a board the numbered slips of paper on which the thirty words were printed. Each S had either thirty concrete words or thirty abstract words. There was no requirement as to the order in which the words could be arranged on the board. They then grouped any nine of the thirty tasks together in some way. After this first grouping was completed, Ss listed the number of the words included in the group and then wrote reasons why they grouped those nine words together. The same procedure was repeated twice with the remaining words on the board. At the end of the word association task the Ss of both conditions had completed a total of three groups of nine words each. Also, three words remained on the board so the Ss had a choice of associations for the third grouping. After the word association task was completed, the Taylor Manifest Anxiety Scale was administered. After 48 hours, all Ss were asked to write the words they could remember.
as a measure of long term recall.

Analysis

Data collected from 14 Ss out of the 110 were eliminated because of missing data, leaving 49 cases assigned to the concrete-word condition and 47 cases assigned to the abstract-word condition. The study contained 52 variables, including long-term recall, the abstract-concrete word variable, and 50 items of the Taylor Manifest Anxiety Scale. The reasons for grouping were not included in the analysis. Intercorrelations and factor analysis calculations were performed as described in the results section.

Results

Eigenvalues were calculated for the correlation matrix. The Scree test (3) indicated 16 factors. An interactive principal axis solution was applied to the correlation matrix until the communalities to three decimal places. A Kaiser Varimax Orthogonal rotation (7) was applied to the factor matrix followed by a full MAXPLANE oblique rotation (5). Nine graphical hand rotations (4) were then performed followed by a MAXPLANE clean up yielding a 78.1 percent 10 width hyperplane.

Factor I: General Apprehension

This factor was characterized by general apprehension or what appeared to be free floating anxiety. This factor seems to be related to Cattell's O factor on the 16PF. Individuals high on this dynamic tended to worry both over possible troubles (-.951) and over things in general (-.808). They reported that they felt anxious about someone or something frequently (-.513) and saw life as straining for them (-.473). These individuals also tended to see themselves as calm and not usually upset (-.375). This sug-
gested that they could not always express overtly that they worried or that they felt anxious. This seemed to be more apparent in that these subjects also tended to not notice their heart pounding and shortness of breath (-.578).

Factor II: Perceived Self Effectiveness

This factor was involved with how effective a person felt himself to be. Individuals who felt themselves to be useless (-.764) also tended to feel they were no good (-.549), were not very confident of themselves (-.353) and saw themselves as not very happy compared to others (-.373). While these individuals did not see themselves as having as many fears as their friends (.539), they did tend to be afraid of people or something they knew would not harm them (-.595). However, they did not see themselves as being anxious very frequently (.345). Their hands and feet were not unusually warm enough (.386.). This factor had a considerable element of self-depreciation.

Factor III: Abstract Recall and Situational Incongruity vs. Concrete Recall and Anxious Incongruity

This factor is of special concern. It was in effect a treatment factor. As the Ss were randomly assigned to groups (abstract-concrete) and in that the Taylor Manifest Anxiety Scale was administered after the treatment, one can only conclude that if both the abstract-concrete variable and the recall variable appeared on the same factor, any other loading on that factor could occur only as a treatment effect of the abstract-concrete words.

This dynamic involved the relationship between anxiety and abstract-concrete word treatments. Individuals with low long-term recall (-.872) of abstract words (+.839) tended to see themselves
as nervous as other people (-.432). They also reported having diarrhea once a month or more (-.275). However, they tended to have nightmares infrequently (+.357) and were not easily embarrassed (+.353).

On the opposite end of the factor, individuals with high concrete word recall did not see themselves as nervous as other people and did not have diarrhea once a month or more. They did report having nightmares every few nights and saw themselves as being easily embarrassed.

The dynamic suggested a relationship between recall of associated words and perceived ambiguity of the experimental situation. Those Ss placed in the abstract group tended to have less recall of the words later. These persons, as opposed to the concrete good recall persons, had to face an ambiguous situation. They possibly reacted to this by repressing the ambiguous words and denying any resulting direct discomfort (seeing themselves as about as nervous as others and not being easily embarrassed). On the other hand, less direct indication of anxiety did appear. They admitted to more nightmares and to having diarrhea to a greater extent than did the concrete group, who could better remember their words.

Factor IV: Lack of Self Confidence vs. Self Confidence

Subjects high on this dynamic expressed that they were not very confident of themselves (.661) and did not like to face difficulty or make an important decision (-.417). They also tended to be easily embarrassed (-.395), were afraid of blushing (-.393) and saw themselves as more self-conscious than most people (-.706). They also tended to be people who rated themselves as taking things hard (-.292). They were not restless (.268). They did often no-
notice their heart pounding and they were often short of breath (.671). These subjects reported that their feelings were hurt easier than most people (-.468), and they did have as many fears as their friends (-.431).

**Factor V: Emotional Reaction**

This factor indicated a relationship between a person's behavior and a desire to be happy with life. A person not having a desire to be as happy as other (.409) tended to not be easily upset (-.824). Excitement (.317) and worry (.579) did not prevent them from sleeping. Logically, then, their sleep was not disturbed (.661). They also tended not to be nervous (.609) nor display compulsive eating behavior (-.283). Physiologically, they reported no stomach disturbances (.669) and awareness of heart pounding and shortness of breath was infrequent (-.257).

The opposite end of the factor indicated behavior more characteristic of emotional reaction. It appeared that persons on this end of the factor reacted to stress with physiological but not hypochondriacal symptoms. A factor similar to this was found by Burdsal (1971).

**Factor VI: Hypochondriasis (or Hypochondriacal Reactions)**

This factor related emotional strain to hypochondriacal reactions. A person who worked under a great deal of strain (-.732) and was not self-confident (-.271) reported various physiological disturbances, e.g., frequent headaches (.398), hands and feet were not warm enough (.457) and constipation (-.400). However, a nauseated stomach was not characteristic of these individuals (.391).

**Factor VII: Social Confidence**

This factor is related to an individual's confidence to assert
himself in social situations. A person who reported both that he rarely blushed (-.623) and that he blushed less than others (.695) not surprisingly reported self-confidence (-.254). Such a person tended not to perspire when embarrassed (.474). However, he felt that he frequently encountered numerous difficulties he could not overcome (-.302). He did not perceive himself as having as many fears as his friends (-.378), nor did he report himself to be a very nervous person (.325). This person tended not to experience a great deal of stomach difficulties (.328).

The opposite end of this dynamic suggested characteristics of a person who avoids difficult situations to prevent embarrassment. Embarrassment tended to be very annoying and nervousness was accompanied by stomach disturbances.

**Factor VIII: Restless Behavior vs. Complacency**

The factor indicated behavior related primarily to an individual's general report of happiness. Subjects who reported they tended not to worry about money and business (.615) nor had dreams they could not relate to other people (.697) also reported that they were happy most of the time (-.352). The same Ss tended not to be restless (.459), and hunger pangs were not experienced most of the time (.461). To become nervous because of waiting (.734) was not characteristic of these persons. They reported they had no difficulty fixing their attention on a particular task (.281). Also, these individuals did not see themselves as more self-conscious than most people (.263), nor did they wish they could be as happy as others (.228).

The opposite end of this dynamic indicated persons with char-
acteristics of restlessness who tended to not be very happy most of the time though they desired to be, who were self-conscious and were nervous.

Factor IX: Driven Determination

The factor appeared to represent very persistent determination. Individuals scoring high on this dynamic indicated that life was often straining to them (-.318), but they felt that there were no difficulties which they could not overcome (.314). These individuals reported having very few headaches (-.835). They felt hungry most of the time (-.301). They also indicated that they seldom noticed their hands shake while doing something (.503).

Factor X: Compensatory Self Confidence

A person high on this factor displayed compensatory attitudes in regard to self-confidence. While displaying several indicators of self-confidence; reported being confident of themselves (-.312), reported rarely blushing (-.386) and blushing less than others (.385), they also were marked by a high level of nightmares (-.673) and stomach trouble (-.331), as well as reporting many difficulties which they could not overcome (-.488). In general persons high on this factor exhibited symptoms produced by difficulties in a physiological reaction and in nightmares rather than in an effect on perceived self-confidence.

Factor XI: Emotional Control vs. Emotional Unconstraint

The dynamic involved an individual's emotional expression to others. Individuals on the emotional control end of the factor reported that they often had dreams they would not relate to other people (-.769). They also felt they had as many fears as their
friends (-.288), but were usually calm (-.403) and not nervous (.339). They felt they did not find it difficult to fix their attention on a particular task (.402) and they did not tire quickly (-.423). Finally, they did not feel that they were sometimes going to crack up (.282).

An individual on the emotional unconstraint end of this dynamic tended to report to others what they dreamed, reported difficulty in maintaining their attention on a particular task, and described themselves as nervous people. They also felt they had as many fears as their friends.

Factor XII: Fear of Emotional Release vs. Emotional Release

Individuals scoring high on this dynamic described themselves as not very happy most of the time (.369), but were not afraid they were going to blush (.286), and felt they were not restless (.325). They also tended not to worry a great deal about something that was not important (.291).

Factor XIII: Emotional Sensitivity

Individuals scoring high on this dynamic tended to feel they were going to crack up (-.604) and they perceived themselves to be the kind of persons who took things hard (-.579). They felt their feelings were hurt easier than most people (-.250). However, they expressed that they did not find it aversive to make decisions or face difficulties (.297). They reported it to be false that often their bowels did not move for several days at a time (.529). They also were not aware of shortness of breath and heart palpitations (-.380).

Factor XIV: Nervous Inattention vs. Concentration

This factor involved an individual's ability to maintain at-
tention on his environment. Individuals high on this dynamic reported that they found it difficult to keep their minds on a particular task or job (-.577) and found it difficult to fix their attention on one thing (-.793). These individuals tended to feel they did not have as many fears as their friends (-.428), but they reported they had been afraid of things or people though they knew no harm could come to themselves (.627). These same individuals tended not to have nightmares very frequently (.446). They also felt they were anxious about something or someone almost all of the time (-.314). Finally, they indicated that their hands and feet were not usually warm enough (.287).

**Factor XV: Emotional Instability vs. Emotional Stability**

An individual scoring high on emotional instability tended to be emotionally upset though he did not seem to feel that life was straining for him (.406). He did not see himself as more self-conscious than most people (.253), nor did he have feelings that he was going to crack up (.285). Nevertheless, he tended to be easily upset (.494) and reported that he was often sick to his stomach (.674). He cried easily (.633) and frequently noticed his hands shaking while doing something (.374). He was aware of heart palpitations and shortness of breath (.289).

On the other end of the dynamic, individuals tended to be less easily upset and reported no stomach nausea even though they felt life was a strain for them.

**Factor XVI: Nervous Release**

Individuals who reported they worked under a great deal of strain (-.406) felt that they were as nervous as other people (.734), and that it made them nervous to have to wait (-.347). They also felt that they blushed as often as others (-.650). Such
individuals tended not to become fatigued easily (.360) and that their sleep was not restless and disturbed (.379). They did not notice their hands shaking while doing a particular task (.301). Finally, they did report constipation (-.451).

Persons on the other end of this dynamic did not work under a great deal of strain but their sleep tended to be restless and disturbed. They also noticed their hands shaking when trying to do something. These individuals did not see themselves as nervous as other people, nor did they feel they blushed as often as others.

In general, this dynamic suggested that persons working under strain release their nervous energy through such work. The nervous energy of individuals not working under strain appeared to be channelled through other behavior other than work as implied by shaking hands and disturbed sleep. This dynamic reminds one of a tension-reduction theory of behavior.

Conclusion

The results pointed toward one dynamic on which loaded anxiety variables related to the two experimental treatments. Recall of concrete words associated appeared to he related to how congruent an individual perceived himself to be with his environment extraneous to the experimental situation. Recall of abstract words appeared to be related to whether a person perceived the experimental conditions as ambiguous.

Of more general significance is the fact that the Taylor Manifest Anxiety Scale produced 15 factors. Essentially all of the factors represented some level of discomfort if an individual scored on a particular end of each factor. One might conclude from
this that the overall measure of anxiety produced by the Taylor Manifest Anxiety Scale is actually comprised of several dynamics.

Footnotes
1. Such matrices as the $R$, $V_0$, $L$, $V$, $R_f$, etc., may be obtained from the authors.

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