

Distinguishing Thinking-Feeling Preferences Through the Content Analysis of Natural Language

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This article investigates the relationship between natural language and personality characteristics. In particular, an effort was made to determine whether "thinkers" and "feelers," as defined by Jung's typologies, differ in terms of the language they use to express themselves. First, a linguistic content analysis scale was developed. Next, 5-min verbal samples were obtained from subjects and content analyzed. Content analysis scores were correlated with subjects' self-evaluations and their scores on the Thinking-Feeling scale of the Myers-Briggs Type Indicator (MBTI). Gender differences relating to thinking-feeling preferences were also investigated. Significant correlations between content analysis and MBTI scores were obtained, suggesting that valid information regarding individual preferences for thinking versus feeling may be obtained through the analysis of natural language. Males and females differed significantly in terms of their MBTI scores and self-evaluations, but not in their content analysis scores.

Because the use of language is a generative and creative process, it may be argued that the words a person uses to express thoughts and feelings reflect that individual's personality characteristics. Patton and Meara (1982) suggested that strings of words occurring in natural conversation serve as "informative display," providing information about a person's psychological processes. Helson (1982) likewise proposed that "the complexity and subtlety of language recommend it as a tool" (p. 410) for studying personality characteristics. In fact, a number of psychologists now maintain that valid inferences can be made about a person's psychological states through the objective, systematic analysis of specified speech characteristics (Viney, 1983). The future of language analysis as a personality assessment technique appears quite promising. Ivey (1981) speculated that linguistic analysis will grow to be an important future direction in research and theoretical organization.

One approach to linguistic analysis involves focusing on the content of an in-

dividual's speech. The topics that are discussed and the words that a person uses are of primary interest in content analysis. Gottschalk (1971) concluded that "the major part of the variance in an immediate psychological state of an individual can be accounted for by variations in the content of the verbal communication" (p. 132).

The content analysis of natural language offers a number of significant potential advantages as a method of personality assessment. For example, Viney (1983) suggested that content analysis bridges the gap between rigor and vigor in that it may be performed in an empirical, quantitative, and precise manner, yet still allow for "humanistic" data collection and assessment that relies, at least in part, on clinical judgment.

According to Mischel (1977), the future of personality assessment will be brighter when we move beyond our favorite paper-and-pencil and laboratory measures and place greater reliance on naturalistic observations and unobtrusive, nonreactive measures. Content analysis is a prime example of such an assessment technique. Verbal samples may be obtained during a free-format interview or during the course of a natural conversation. The individual being assessed is free to choose the topics to be discussed and the extent to which personal information is revealed. The anxiety often associated with psychological assessment and tendencies toward socially desirable responding are generally less problematic when personality assessment is conducted in such a natural, nonthreatening manner (Viney & Westbrook, 1979).

The purpose of our study was to develop a content analysis scale capable of identifying individual preferences for thinking versus feeling. One of the earliest and most comprehensive discussions of the processes of thinking and feeling is contained in Jung's (1923/1971) description of personality types. According to Jung, thinking involves analytic processing and the use of factual information. The prototypical thinker interacts with the world through the use of logic, reason, objectivity, and impersonal judgments (Carlyn, 1977; Myers, 1962). In contrast, the process of feeling is associated with an affective state of consciousness, such as that resulting from emotions, sentiments, and desires. Jung maintained that judgments based on feelings are influenced by personal values and that people who rely on feeling more than thinking attend to internal promptings more than external data.

With regard to personality assessment, the importance of the thinking-feeling distinction has been highlighted by a growing interest in cognitive theories of personality. A number of modern theorists and researchers are currently reconsidering Jung's information-processing conceptualization of personality. In particular, the functions of thinking and feeling are of interest to those psychologists who now maintain that "a great deal of the variety in personality and interpersonal behavior [is] attributable to differences in cognitive-affective style" (Helson, 1982, p. 409).

The development and initial testing of the thinking-feeling content analysis

scale in the present study involved a two-step process. First, a lexicon of words theoretically associated with thinking and feeling processes was developed and empirically evaluated. Next, actual verbal samples were collected and content analyzed using the previously developed lexicon to ascertain whether thinkers and feelers, as determined by independent measures, differed significantly in terms of the language they used to express themselves.

METHOD

Phase 1: Scale Development

Item selection. The lexicon developed for the purpose of content analysis originally contained 187 verbs believed to be associated with thinking and feeling experiences. Of the verbs initially selected for the lexicon, 64 were taken from the *User's Manual for the Computer-Assisted Language Analysis System (CALAS; Pepinsky, Baker, Matalon, May, & Staubus, 1977)*. Among other things, the CALAS dictionary classifies verbs that are associated with either cognitive or affective experiences. These verbs were selected to form the original core of the thinking-feeling lexicon used in our study. The remainder of verbs selected for the lexicon include synonyms of the core words listed in *Roget's Thesaurus*. In selecting words for the lexicon, an intuitive attempt was made to select words frequently used by people to describe their cognitive and affective experiences.

Procedure. The classification of verbs as either thinking or feeling and the establishment of item weights were accomplished by having 161 undergraduate volunteers rate each of the verbs in the lexicon on a 9-point Likert scale. Subjects were instructed to assign negative values to words they considered to be thinking words and positive values to feeling words. Neutral words were assigned scores near the median value of 0. By definition, a value of -4 corresponded to a *purely cognitive experience*, whereas the opposite extreme value of $+4$ represented a *purely affective experience*.

The means of the subjects' ratings for each word were subsequently calculated, and standard errors were used to construct 99% confidence intervals around the average rating for each verb. If the confidence interval around a word included both positive and negative values, the word was considered to be neutral. In all, the final thinking-feeling content analysis lexicon contained 99 thinking verbs, 71 feeling verbs, and 17 neutral verbs. The mean value of the 170 thinking and feeling verbs was -0.16 , which was very near the median neutral score of 0. Examples of some of the thinking and feeling verbs contained in the lexicon, including the weights determined by the subjects' mean rating for each word, are presented in Table 1.

TABLE 1
Examples of Words and Item Weights Contained in the
Thinking-Feeling Lexicon

Thinking Words		Feeling Words	
Think	-3.7	Feel	3.7
Analyze	-3.3	Love	3.6
Study	-3.1	Fear	3.1
Comprehend	-2.9	Enjoy	3.0
Conclude	-2.7	Care	2.9
Evaluate	-2.7	Desire	2.9
Reason	-2.7	Envy	2.9
Decide	-2.5	Suffer	2.8
Know	-2.4	Hope	2.7
Question	-2.2	Adore	2.6
Remember	-1.7	Worry	2.3
Realize	-1.7	Miss	1.8
Speculate	-1.7	Regret	1.6

Phase 2: Analysis of Verbal Samples

Subjects. Undergraduate student volunteers ($N = 42$), including an equal number of males and females, were involved in the second phase of the project.

Instruments. Each subject was asked to complete the Myers-Briggs Type Indicator-Form G (MBTI) and a single-question self-evaluative measure of thinking-feeling preferences. The scores obtained on these instruments were subsequently used as criterion measures with which content analysis scores were compared.

A number of recent studies (Carlson, 1980; Carlyn, 1977; Cohen, Cohen, & Cross, 1981; Kerin & Slocum, 1981; Tzeng, 1984) suggest that the Myers-Briggs Type Indicator is a valid instrument for assessing personality types. This is not to suggest that the MBTI is without critics (Comrey, 1983; Harrison, 1976; Loomis, 1982). Nevertheless, at present, it is still the instrument that is most widely used for evaluating thinking-feeling preferences. As such, it was selected as an appropriate standard with which the experimental thinking-feeling content analysis scale could be compared.

A single item, 9-point Likert scale (1 to 9) was used to evaluate each subject's self-reported preference for thinking versus feeling. Prior to making this judgment, subjects were provided with brief descriptions of the thinking and feeling processes. The statement *I make all of my decisions based on thinking* was placed at the low end (1) of the continuum, and the statement *I make all of my decisions based on feelings* was placed at the high end (9). Subjects were instructed to rate themselves by placing a mark at any one of nine positions along the continuum.

Procedure. A verbal sample was obtained from each subject on the same day that he or she completed the MBTI and the thinking-feeling self-evaluation. The verbal samples were collected during 15-min tape-recorded interviews between subjects and the experimenter. Following a brief introduction, subjects were requested to discuss a topic of their own choosing. The only guideline provided was that subjects were asked to discuss a topic that was in some way personally meaningful and, in so doing, to express their thoughts and feelings. Subjects were then told that they would be given 5 min to speak, during which time the experimenter would prefer to remain silent and not reply or answer questions.

Subjects were given an opportunity to ask questions about the instructions and take a moment to consider what they wished to discuss. When ready, a tape recorder was turned on, and subjects were allowed to speak for 5 min. Brief prompts were occasionally provided for subjects who ran out of things to say during the 5-min period. After interviewing all subjects, the taped verbal samples were then carefully transcribed for the purpose of content analyses.

Scoring of verbal samples. Verbal samples were scored using a word-matching technique in which transcripts were examined to identify the use of words contained in the thinking-feeling lexicon. When key words were identified, they were assigned weights on the basis of their previously determined thinking-feeling classification. Two experimental methods were used to assign weights to identified words. In the first method, precise weights defined by the mean rating of each word in the thinking-feeling lexicon were used. These weights ranged in value from -3.7 for the word *think* to $+3.7$ for the word *feel*. Unit weighting was used for the second method of scoring, with -1 scored for each thinking verb and $+1$ scored for each feeling verb. Subsequent analyses revealed no significant differences between the results obtained using the two methods. Consequently, the results reported in this article are those based on content analyses utilizing the simpler method of unit weighting.

Two minor exceptions to the strict word-matching approach of identifying scorable items should be noted. First, verbs used in parenthetical or nonessential phrases were not scored. For example, habitually used phrases such as "you know," "I guess," and "you see," which did not contribute substantially to the meaning of a sentence, were disregarded. Second, a few important verbs that had not been included in the lexicon were scored by assigning the weights associated with synonyms of the missing words. For example, the verb *plan* had inadvertently been omitted from the lexicon but was scored with the weight assigned to the verb *intend*. Such substitutions accounted for less than 5% of the total number of scored items.

Following the identification of all scorable items, content analysis scores were computed for each subject. Content analysis scores were calculated by first summing the unit weights (-1 or $+1$) assigned to the scored items in each sub-

ject's transcript. This sum was then divided by the total number of words in each transcript to control for verbal productivity or talkativeness. Finally, scores were then multiplied by 1,000 to avoid working with small decimal values. The strength of each subject's preference for thinking versus feeling was determined by considering the sign and magnitude of the final obtained score. A negative total score reflected a preference for the use of thinking words, whereas a positive total score indicated a preference for the use of feeling words. Larger absolute values were interpreted as reflecting stronger preferences for either thinking or feeling.

RESULTS

Reliability

A modified split-half technique was used to assess the reliability of subjects' content analysis scores. Verbal scores for the first and third quarters of the recorded interviews were combined and then correlated with scores obtained for the second and fourth quarters of each 5-min interview. Consequently, each "half-test" consisted of 2½ min of verbal discourse. The correlation between halves was $r(42) = .69$, which when adjusted by the Spearman-Brown formula (Nunnally, 1978) yielded an estimated split-half reliability of .82 for content analysis scores based on 5-min verbal samples.

Validity

One method used to assess the validity of verbal content analysis scores involved correlating content analysis scores with the subjects' scores on the Thinking-Feeling scale of the MBTI. To carry out this analysis, MBTI scores were converted to continuous scores in a manner similar to that recommended by Myers (1962). Thinking scores were subtracted from the median value of 0 (i.e., were converted into negative values), whereas feeling scores were retained as calculated. A Pearson product-moment correlation of $r(42) = .55$, $p < .001$, revealed a significant relationship between content analysis scores and the scores subjects obtained on the Thinking-Feeling scale of the Myers-Briggs Type Indicator.

Because MBTI scores are often used to classify people according to their personality types (e.g., thinking or feeling), chi-square tests were also used to assess the validity of the thinking-feeling content analysis scale. Both MBTI and content analysis scores were dichotomized so that subjects could be classified as either thinkers or feelers. In the case of content analysis scores, subjects with negative sum scores (those using more thinking than feeling verbs) were classified as thinkers, and those with positive sum scores were classified as feelers. Of the orig-

inal 42 subjects, 3 had sum scores of 0 and were thus not classified as thinkers or feelers, or subsequently used in the chi-square analysis. The classification of subjects as thinkers or feelers on the basis of both their content analysis and MBTI scores is presented in Table 2. The result of the 2×2 chi-square indicated a significant level of agreement between MBTI and content analysis classification, $\chi^2(1, N = 39) = 4.31, p < .05$.

Because a number of subjects' MBTI and content analysis scores did not indicate a strong preference for either mode of information processing, a second chi-square analysis was conducted in which only those subjects whose scores on both measures indicated a clear preference for thinking or feeling were considered. Included in this analysis were subjects who had MBTI scores with absolute values greater than 10 and content analysis scores with absolute values greater than 5.35. In both cases, the scores selected as cutoff points represent the lowest absolute values around which no portion of a 99% confidence interval crossed the boundary between thinking and feeling scores. As can be seen in Table 3, only 1 of 16 subjects demonstrating a marked thinking-feeling preference on both measures was classified inconsistently, $\chi^2(1, N = 16) = 12.34, p < .001$.

TABLE 2
Categorization of Thinkers and Feelers on the
Basis of Content Analysis and Myers-Briggs Type
Indicator (MBTI) Scores

	Content Analysis	
	Thinkers	Feelers
MBTI		
Thinkers	14	6
Feelers	7	12

Note. $\chi^2(1, N = 39) = 4.31, p < .05$.

TABLE 3
Categorization of Subjects With Both Content
Analysis and Myers-Briggs Type Indicator
(MBTI) Scores Indicating a Marked Preference
for Either Thinking or Feeling

	Content Analysis	
	Thinkers	Feelers
MBTI		
Thinkers	9	1
Feelers	0	6

Note. $\chi^2(1, N = 16) = 12.34, p < .001$.

When content analysis scores were correlated with the subjects' self-evaluations (SE), nonsignificant results were obtained, $r(41) = .22, p < .10$. This correlation contrasts with the correlation between SE and MBTI scores, $r(41) = .61, p < .001$.

Because Jung's theory of personality types (Loomis, 1982) and research findings (Stricker & Ross, 1964; Woehlke & Piper, 1980) suggest that males are more likely to be thinking types and females are more likely to be feeling types, *t* tests were conducted to investigate whether males and females differ significantly in terms of their thinking-feeling preferences as measured by their MBTI, SE, and content analysis scores. On two of the three measures, males obtained significantly lower mean scores than females, suggesting a male preference for thinking and a corresponding female preference for feeling. On the MBTI, the mean score for males was -17.9 , whereas the mean score for females was 3.0 . The difference between these values was statistically significant, $t(40) = 3.12, p < .01$.

Females and males also differed significantly in terms of their self-evaluation on the 9-point thinking-feeling Likert scale. The mean score for males was 3.9 in comparison to a mean score of 5.4 for females. An analysis of the difference between these means resulted in a value of $t(39) = 2.86, p < .01$.

In contrast, the difference between the average content analysis scores for males and females was nonsignificant. However, a trend in the expected direction was observed. Males obtained an average content analysis score of -4.4 , indicating a slight preference for thinking, whereas females received an average score of $+1.4$, resulting in a difference value of $t(40) = 1.42, p = .16$.

DISCUSSION

The obtained split-half reliability of $.82$ for content analysis scores suggests that thinking and feeling words do not simply occur randomly in speech but are used by individuals in patterns that are relatively consistent over short periods of time. In addition, even though many subjects changed topics a number of times during the course of their 5-min interviews, the split-half reliability of content analysis scores does not appear to have been adversely affected. Although the results of this study tend to substantiate the split-half reliability of the thinking-feeling content analysis scale scores, additional research is still needed to investigate the stability of these scores over extended periods of time. The important issue of whether thinking-feeling content analysis scores reflect relatively stable personality traits or types as opposed to more transient cognitive-affective states has yet to be addressed.

The results of this study appear to validate the general premise of content analysis, namely, that the analysis of a person's speech patterns may reveal significant information about that individual's personality characteristics. In the present case, there is strong evidence that individual thinking-feeling preferences are cor-

related with the use of certain verbs in natural language. The most convincing evidence supporting this conclusion is the correlation obtained between subjects' scores on the Thinking-Feeling scale of the MBTI and the content analysis scores obtained when their verbal samples were analyzed.

Equally compelling are the results obtained when subjects were categorized into independent groups of thinkers and feelers on the basis of their MBTI and content analysis scores. The dichotomous categorization of only those subjects whose scores on both measures indicated a definite preference for thinking or feeling resulted in a 94% rate of agreement.

The fact that the correlation between content analysis scores and subjects' self-evaluations was nonsignificant is not necessarily problematic; however, it does raise some interesting questions because both measures correlated significantly with subjects' scores on the Thinking-Feeling scale of the MBTI.

One possible explanation for the relatively low correlation between self-evaluations and content analysis scores may be related to the relative transparency of the two measures. The content analysis of natural language, as the more subtle or projective of the two assessment techniques, may tap a different aspect of personality than that revealed through the highly transparent self-evaluation instrument used in the present study. Additional research is needed to address this question.

Results of this study also indicated that, on the average, males are more likely to be thinkers, whereas females are more likely to be feelers. However, males and females differed significantly only in terms of their MBTI scores and self-evaluations, not in their content analysis scores.

A possible explanation for these results may again be related to the relative transparency of the assessment instruments and the influence of social desirability. As fairly transparent self-report measures, the MBTI and the self-evaluation instrument used in this study are susceptible to socially desirable responding. If traditional stereotypes of the rational, cognitive male and the sensitive, feeling female were to some degree endorsed by the university students who participated in this study, an exaggeration of scores in socially desirable directions on the more transparent measures might be expected. Because speech is generally spontaneous and subjects were naive with regard to the experimenters' interests when speech samples were collected, verbal samples would theoretically be less susceptible to socially desirable responding. The fact that content analysis scores appear to minimize the differences between the sexes could, in fact, prove to be a strength of content analysis as a personality assessment technique. Additional research in this area is still needed, however.

In conclusion, the results of this study generally appear to support the validity of content analysis as an effective method for assessing individual preferences for thinking versus feeling as methods of information processing. Although additional research is needed to replicate the findings of this study and to address a

number of yet unanswered questions, the initial results are encouraging. Natural language may yet prove to be one of the richest sources of information available for the assessment of individual personality characteristics.

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Received January 22, 1986

Revised May 7, 1986