

Reinterpreting the Myers-Briggs Type Indicator From the Perspective of the Five-Factor Model of Personality

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ABSTRACT The Myers-Briggs Type Indicator (MBTI, Myers & McCaulley, 1985) was evaluated from the perspectives of Jung's theory of psychological types and the five-factor model of personality as measured by self-reports and peer ratings on the NEO Personality Inventory (NEO-PI, Costa & McCrae, 1985b). Data were provided by 267 men and 201 women ages 19 to 93. Consistent with earlier research and evaluations, there was no support for the view that the MBTI measures truly dichotomous preferences or qualitatively distinct types; instead, the instrument measures four relatively independent dimensions. The interpretation of the Judging-Perceiving index was also called into question. The data suggest that Jung's theory is either incorrect or inadequately operationalized by the MBTI and cannot provide a sound basis for interpreting it. However, correlational analyses showed that the four MBTI indices did measure aspects of four of the five major dimensions of normal personality. The five-factor model provides an alternative basis for interpreting MBTI findings within a broader, more commonly shared conceptual framework.

The Myers-Briggs Type Indicator (MBTI, Myers & McCaulley, 1985) is unusual among personality assessment devices for three reasons. It is based on one of the classic statements of personality theory, it purports to measure types rather than traits or other continuous variables, and it is

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widely used to explain individuals' personality characteristics not only to professionals but also to the individuals themselves and to their friends, families, and co-workers. These distinctions have made the MBTI a popular personality instrument for organizational and industrial psychologists (e.g., Hirsh, 1985) and for individuals who wish to understand themselves better.

Personality psychologists, however, have generally been less enthusiastic about the MBTI. Stricker and Ross (1964a, 1964b) conducted extensive and sophisticated analyses that led them to a critical evaluation of both the typology and the scales themselves, and their concerns have been echoed by more recent critics. Theorists complain that the Jungian concepts that are supposed to underlie the MBTI have been distorted (Coan, 1978; Comrey, 1983). Psychometricians are troubled by the conception of psychological types (Mendelsohn, Weiss, & Feimer, 1982) and the limited evidence that the MBTI measures anything other than quasi-normally distributed personality traits (DeVito, 1985; Hicks, 1984).

Even critical reviewers, however, see promise in the instrument, and its continued popularity, as well as empirical literature to date, suggests that it is effective at some level. In the present article we assess the MBTI from the perspective of Jungian theory, we then offer an alternative conceptualization of the scales of the MBTI in terms of a taxonomy of personality traits widely accepted in mainstream personality psychology, the five-factor model (Digman & Inouye, 1986; McCrae & Costa, 1987; Norman, 1963).

Jung's Types and the MBTI Scales

In *Psychological Types*, Jung (1923/1971) reviewed the history of psychological typologies from classical literature and poetry through the writings of William James as a basis for his own formulations. His central distinction was between introverted and extraverted attitudes, which represent fundamental orientations to either the objective or the subjective world. Further, he postulated that individuals relate to the world through two sets of opposed functions: the rational (or judging) functions of thinking and feeling, and the irrational (or perceiving) functions of sensing and intuition. Finally, one of the four functions was seen as the dominant, and a second as the auxiliary function.

Although it provides rich insights into some aspects of individual differences, Jung's theory also creates formidable obstacles to the develop-

ment of an inventory for assessing types. Much of his description concerns the unconscious life of the individual, which is not directly accessible to self-report. The subjective world of introverts is populated by archetypes and images that are not easily communicated, Jung wrote that introverted feeling “manifests itself for the most part negatively” (p. 387) and that the introverted sensing type “is uncommonly inaccessible to objective understanding, and he usually fares no better in understanding himself” (p. 397). Descriptions of attitudes and functions sometimes seem to overlap—for example, sensing types often seem to resemble extraverts—and all classifications are complicated by the intrusion of unconscious elements of the opposing function when the dominant, conscious function is overdeveloped. Finally, Jung’s descriptions of what might be considered superficial but objectively observable characteristics often include traits that do not empirically covary. Jung described extraverts as “open, sociable, jovial, or at least friendly and approachable characters” (p. 330), but also as morally conventional (p. 334) and tough-minded in James’s sense (p. 307). Decades of research on the dimension of extraversion show that these attributes simply do not cohere in a single factor (Guilford, 1977, Guilford & Guilford, 1934). The MBTI manual itself contradicts Jung by using tough-minded to describe the thinking function rather than the extraverted attitude (Myers & McCaulley, 1985, p. 13).

Faced with these difficulties, Myers and Briggs created an instrument by elaborating on the most easily assessed and distinctive traits suggested by Jung’s writings and their own observations of individuals they considered exemplars of different types and by relying heavily on traditional psychometric procedures (principally item–scale correlations). Their work produced a set of internally consistent and relatively uncorrelated indices measuring Extraversion–Introversion (EI), Sensing–Intuition (SN), and Thinking–Feeling (TF). They also added a Judgment–Perception (JP) index that indicates, in conjunction with the EI preference, whether the rational or irrational function is dominant. Each of the indices is dichotomized at a theoretically fixed zero point to show a preference, and a four-letter code gives the type classification. Numeric scores indicate the strength of preference, and a continuous score can be computed for each index that contrasts strengths of opposing preferences.

Jungians might question the addition of the JP scale, or even the enterprise of constructing a self-report type indicator. From the psychometric perspective, however, the MBTI may be looked upon as an ad-

vance over Jung's largely untested speculations. However one chooses to evaluate the instrument, it is crucial to realize that it is not isomorphic with the theory on which it is based. In consequence, using the MBTI to test Jungian theory, or using the results of such tests to validate the MBTI, must be viewed with caution.

Continuous Scoring and Typologies

The MBTI is offered as a "type indicator" on the assumption that it can classify individuals into 1 of 16 qualitatively different types, formed by combination of the four dichotomous preferences. In some respects, the validity of this typology is the central question in the evaluation of the instrument. If qualitatively distinct types cannot be demonstrated, then either Jung's theory is wrong, or the MBTI fails to operationalize it adequately. In the absence of evidence for the typology, the instrument becomes merely a series of scales whose information is reduced, rather than increased, by dichotomous classifications; the characteristics that set it apart from countless other personality instruments vanish, and it must be evaluated and used in a more traditional context.

MBTI theory specifies three levels at which distinctive typological characteristics should be seen: in qualitative differences between opposed preferences, in the identification of a dominant function through the use of the EI and JP scales, and in statistical interactions among preferences on external criteria.

The first issue concerns the validity of dichotomizing preference scores. Although most trait psychologists adopt the language of types in discussing individuals (contrasting, e.g., introverts and extraverts), this is generally done as a convenient way of saying "above average on a normally distributed trait" or "below average." Jung himself appears to adopt this position in some of his writings, admitting that there are intermediate positions between pure introversion and pure extraversion, in which individuals are "influenced as much from within as from without" (1923/1971, p. 516). The authors of the MBTI, however, have adopted the interpretation that types are mutually exclusive groups of people, and that the cutting point between them is not arbitrary, but a true zero point. The most persuasive evidence for this would be a clear bimodal distribution of preference scores. None of the MBTI indices shows bimodality, a point which Stricker and Ross (1964a) held against them.

An alternative interpretation of the nature of types points to a more subtle form of discontinuity, in which external correlates (or regression coefficients) vary for the two types (Hicks, 1984, Mendelsohn et al., 1982). The manual provides some studies showing such disparities in the relations between external criteria and opposite preferences. For example, when grade-point average is plotted against EI scores, there appears to be a jump at the zero point, with introverts showing higher grades. The effect, however, is extremely subtle, and the authors admit that "for such small differences to be visible, samples of 4,000–5,000 are needed" (Myers & McCaulley, 1985, p. 158). DeVito (1985) concludes that the evidence provided by the manual on this issue is "weak."

A second typological characteristic that must be addressed concerns the JP index. This preference is intended to show which of the two types of functions—judging or perceiving—is favored in dealing with the external world, in combination with the EI preference, it determines the dominant and auxiliary functions specified in Jung's theory. Individuals classified as ENTJ (i.e., Extraverted, Intuitive, Thinking, and Judging) emphasize the judging function of Thinking in the external world, as Extraverts, they would have Thinking as the dominant function and Intuition as the auxiliary. INTJs (Introverted, Intuitive, Thinking, and Judging individuals) would also show a preference for Thinking in dealing with the external world, but because they are Introverts, this would be their auxiliary function. The distinction between auxiliary and dominant functions is important in Jungian theory, and forms the major rationale for the JP index. It is therefore surprising that so few studies have attempted to validate it. Myers and McCaulley noted that "according to theory, the dominant function will show a clearer preference [i.e., a higher preference score] than will the auxiliary" (1985, p. 58), but admitted that "scores for the dominant are greater than those for the auxiliary in only about half the types" (p. 60)—as one would expect from chance.

Third, if the 16 types represent unique configurations of attitudes and preferences, as MBTI theory holds, there should be evidence of differences between types above and beyond that attributable to the four preferences themselves. Although other interpretations are possible (Block & Ozer, 1982), most researchers have interpreted this to mean that there must be theoretically meaningful and statistically significant interaction effects as well as main effects (Mendelsohn et al., 1982, Weiss, Mendelsohn, & Feimer, 1982). As Hicks (1985) noted, "without evidence for

interactions there is no evidentiary basis for a 16-box matrix of distinct types" (p. 13). Hicks (1984) herself failed to demonstrate predicted interactions, and Stricker and Ross (1964a) found no evidence of interaction effects in analyses of academic aptitude and performance measures. They recommended further study of this question using "other kinds of variables, particularly those from the personality sphere" (p. 69).¹

Finally, it might be noted that scale development apparently disregarded the hypothesized typological structure. If the types are qualitatively distinct, one might need to create different scales to measure Thinking-Feeling (and Sensation-Intuition) in extraverts and in introverts. Instead, the indices were developed as four independent scales, with item selection pooled across all different types.

Experimental and Correlational Approaches to Scale Validation

Most studies on the validity of the MBTI have focused on individual indices rather than the full typology. Because of its explicit theoretical basis, some researchers have adopted an experimental, hypothetico-deductive approach to validation of the MBTI indices (J. G. Carlson, 1985; DeVito, 1985). For example, R. Carlson (1980) conducted a study in which students were asked to write letters introducing themselves to an imagined foreign correspondent. As hypothesized, intuitive types were more likely to make references to the imagined other, sensing types were more likely to provide physical descriptions of themselves.

An alternative to the experimental approach in personality research is the correlational study, in which a new scale is related to established measures. It is possible to test specific hypotheses if alternative measures of the same or theoretically related constructs are used. In the case of the MBTI, the problem is that few other instruments attempt to measure Jungian constructs. Aside from those in the Jungian Type Survey (Wheelwright, Wheelwright, & Buehler, 1964), which do correlate with the cor-

1 The dependent variables for which interaction effects should be found must, of course, be different from the MBTI categorizing variables. If MBTI indices are themselves simply measures of traditional personality variables, it would not make sense to look for interaction effects on other measures of the same personality variables. The MBTI typology, however, claims to be something other than an inventory of personality traits, and under this hypothesis, an examination of personality measures as dependent variables is appropriate.

responding MBTI indices, there are few alternative measures of sensing versus intuition or thinking versus feeling

Correlational research may also be exploratory, seeking an interpretation of the scale from a pattern of convergent and discriminant relations. There is no lack of correlational data on the MBTI, as the manual (Myers & McCaulley, 1985) amply attests. What is needed, however, is a meaningful framework in which to organize and interpret the many correlates—a set of standard dimensions by reference to which the MBTI indices can be understood. Ideally, this set would systematically sample the full range of personality traits, providing the basis for a comprehensive assessment of the MBTI.

One classification of traits—the five-factor model—seems to provide a comprehensive taxonomy. Beginning with the work of Allport and Odbert (1936), several studies have attempted to specify exhaustively the range of personality traits by examining English language trait names, on the assumption that native speakers would have evolved words for all important individual differences. Independently, Block (1961) and his colleagues sought to provide a universal, clinically based language for describing all important aspects of personality, and they developed the California Q-Set (CQS). Research from both these traditions has converged on the five-factor model of personality (Goldberg, 1981, McCrae, Costa, & Busch, 1986, Norman, 1963), and the same factors have also been identified in studies of several standard personality inventories (Costa & McCrae, 1985a, McCrae & Costa, 1985a, 1987).

The five-factor model is not based on any single theory of personality, but has been shown to encompass scales that operationalize a number of theoretical perspectives (McCrae & Costa, 1985a, 1985b). The model has been recovered in ratings (Tupes & Christal, 1961) as well as self-reports (McCrae & Costa, 1985c), in German (Amelang & Borkenau, 1982) as well as English, in children (Digman & Inouye, 1986) as well as adults. Although not universally recognized as a comprehensive taxonomy (Waller & Ben-Porath, 1987), an increasing number of personality researchers have adopted some version of the five-factor model (Funder & Colvin, 1988, McCrae & Costa, in press-a).

Each of the five dimensions represents a broad domain comprising a variety of more discrete traits, or facets. *Neuroticism* includes the predisposition to experience negative affects such as anxiety, anger, and depression, and other cognitive and behavioral manifestations of emotional instability. *Extraversion* includes sociability, activity, dominance, and the tendency to experience positive emotions. *Openness to Experi-*

ence is seen in imaginativeness, aesthetic sensitivity, depth of feeling, curiosity, and need for variety *Agreeableness* encompasses sympathy, trust, cooperation, and altruism, *Conscientiousness* includes organization, persistence, scrupulousness, and need for achievement

Those familiar with the content and correlates of the MBTI indices may note some conceptual similarities, beyond the obvious alignment of the two Extraversion scales (Dachowski, 1987). In particular, Intuitives seem to be open to experience whereas sensing types are closed, Feeling types seem to be agreeable and Thinking types antagonistic, and Judging types seem high and Perceiving types low in Conscientiousness.² Note that these correspondences do not necessarily derive directly from Jungian theory. Jung (1923/1971) does describe both extraverted and introverted intuitive types as "continually scenting out new possibilities" (p. 400) in the outer and inner worlds, respectively, so the link of SN with Openness seems justified. However, as we have pointed out, Jung's conception of extraversion is more diffuse than that embodied in the Extraversion factor. Moreover, it would be difficult to justify the association of the feeling function with Agreeableness. For Jung, *thinking* is an intellectual activity in which judgments are based on the rational application of principles, *feeling* is the assignment of value (acceptance or rejection) to objects of experience. An individual whose first reaction to each experience was a judgment of rejection (contempt, mistrust, or hatred) without a logical basis would be classified by Jung as a feeling type, but would probably score very low on the MBTI Feeling preference. As described by Jung, the thinking and feeling functions seem to refer to emphases on different modes of experience, and might be related more directly to facets of Openness (see Coan, 1974).

In the present research, we first examine characteristics of the MBTI typology, evaluating the utility of the JP scale in indicating dominant function and searching for interaction effects on personality variables. We then consider relations between the MBTI continuous scales and the five factors of personality as measured by the NEO Personality Inventory (NEO-PI), using both self-reports and peer ratings of personality. In addition, we test the hypothesis that the TF scale is positively related to

2 Similarly, Conley (1985) associated Sensing versus Intuition with a Conservative-Radical dimension, and Thinking versus Feeling with a Tough-Minded-Tender-Minded dimension.

openness to Feelings, and negatively related to openness to Ideas. These analyses should provide a basis for understanding the MBTI scores within the framework of a widely accepted personality taxonomy.

METHOD

Subjects

Participants in the Baltimore Longitudinal Study of Aging (BLSA, Shock et al., 1984) and their spouses provided data for the study. BLSA volunteers are a group of predominantly white, community-dwelling individuals who have agreed to return for periodic biomedical and psychological testing. Most have at least a college degree, and many have advanced degrees. Comparisons with a national sample (Costa et al., 1986) suggest that they are somewhat higher than the general population in Openness to Experience, but do not differ markedly in Extraversion or Neuroticism. The 267 men who provided complete data on both the NEO-PI and MBTI ranged in age from 21 to 93 ($M = 62.7$), the 201 women ranged in age from 19 to 93 ($M = 58.9$).

A subsample of 70 men and 35 women had previously participated in a peer rating study. Mean ratings on the NEO-PI were provided by from one to four friends and neighbors, details are given elsewhere (McCrae & Costa, 1987).

Measures

Form G of the MBTI (Myers & McCaulley, 1985) was used in this study. This form consists of 126 questions, of which only 94 are actually scored. Most items offer a forced-choice between two responses, although some have more response options, and respondents are occasionally allowed to endorse two or more responses. Separate scoring keys are provided for each preference (e.g., both E and I, both S and N), although most items are simply reverse scored for the opposing function. Because the opposing preference scores are almost completely ipsative, they are not analyzed separately here. Preference is determined by the greater of the two preference scores (with provisions for breaking ties), and a four-letter code (e.g., INTJ) summarizes all four sets of contrasts and specifies into which of the 16 types the individual is classified.

Four continuous scores can also be obtained that correspond to the difference between opposing preferences; these scores have a theoretical neutral point of 100. Both internal consistency and retest reliability of the continuous scores are adequate, according to the manual, from 31% to 61% of sub-

jects showed identical four-letter types after retest intervals of from 5 weeks to 6 years. The four continuous scores show low intercorrelations except for SN and JP, which are positively related, $r = .38$, in both normative data and the present sample.

The NEO-PI (Costa & McCrae, 1985b) is a 181-item questionnaire developed to operationalize the five-factor model. Early work emphasized the three domains of Neuroticism (N), Extraversion (E), and Openness to Experience (O), each measured by six 8-item facet scales and a total domain scale. The facets of Neuroticism are Anxiety, Hostility, Depression, Self-Consciousness, Impulsiveness, and Vulnerability, the facets of Extraversion are Warmth, Gregariousness, Assertiveness, Activity, Excitement Seeking, and Positive Emotions, and the facets of Openness are Fantasy, Aesthetics, Feelings, Actions, Ideas, and Values. Global, 18-item scales measuring the domains of Agreeableness (A) and Conscientiousness (C) were later added.

NEO-PI items are answered on a 5-point Likert scale, and scales are balanced to control for acquiescence. Social desirability does not appear to bias NEO-PI scales when used in volunteer samples (McCrae & Costa, 1983). Internal consistency for the five domain scales ranges from .76 to .93, and scores for adults are very stable, with 3- to 6-year retest coefficients ranging from .63 to .83 (Costa & McCrae, 1988). NEO-PI scales have been correlated with other questionnaires, observer ratings, and sentence completions, and have been used to predict psychological well-being, coping styles, and somatic complaints (Costa & McCrae, 1985b). A third-person form of the NEO-PI has been developed and validated for use by raters (McCrae & Costa, 1987).

The 18 N, E, and O facet scales and the A and C domain scales were factored to provide an optimal operationalization of the five-factor model (McCrae & Costa, in press-b). Factors were rotated to maximize convergent and discriminant validity with a series of external criteria, including peer and spouse ratings and self- and interviewer Q-sorts. The NEO-PI factors correlate highly with their corresponding domain scales ($r_s = .79$ to $.96$), but show a somewhat stronger pattern of convergent and discriminant validity, particularly for the A and C factors.

The MBTI and NEO-PI were mailed to subjects in June 1986 and returned by mail; peer ratings on the NEO-PI were obtained in 1983. Because of the stability of personality scores in adults, this time lag is unlikely to affect results substantially (Costa & McCrae, 1985a). Both inventories were scored according to directions in the manuals, and all subjects with complete data are included in the analyses.

Finally, instruments offering alternative operationalizations of the five-factor model had been administered to subsets of subjects. Factors from self-sorts on Block's (1961) CQS (McCrae et al., 1986) were available for 119 men and 49 women, factors from an adjective checklist (McCrae & Costa, 1985c) were available for 133 men and 58 women.

RESULTS

Although the absence of normative information on continuous scores makes comparison difficult, the present sample seems to resemble other adult samples in the distribution of MBTI scores. For purposes of comparison, subjects were classified into four-letter code types. Men clustered in the ISTJ (27.7%) and ESTJ (18.0%) types, whereas women were somewhat more evenly distributed among the 16 types. Normative data from a national sample (Tables 4.12 and 4.13 in Myers & McCaulley, 1985) show a similar pattern. Age, sex, and years of education were correlated with the four continuous scales, only three correlations were greater than .20: age with JP ($r = -.28$), gender with TF ($r = .39$), and education with SN ($r = .23$). Older subjects preferred judging, women preferred feeling, and better-educated individuals preferred intuition.

Jungian theory suggests that a balance between opposing functions should be developed in later life, so it might be hypothesized that older men and women would show less extreme scores on the SN and TF scales. However, *F* tests for the equality of variance for subjects above and below age 65 showed no significant differences—a null finding replicated by the data in Appendix C of the MBTI manual given for a younger group of adults. These cross-sectional studies provide no support for the Jungian theory of adult personality development. Either Jung's theory is incorrect on this point, or the MBTI indices do not adequately operationalize Jungian constructs.

Analyses of the Typology

According to MBTI theory, individuals classified as EJ or IP have a dominant judging function (i.e., T or F), whereas those who are classified as EP or IJ have a dominant perceiving function (S or N). The dominant function is the most highly developed, so the individual should show the clearest preference for it. Strength of preference for judging can be assessed by the distance (in either the thinking or feeling direction) of the continuous TF score from the neutral point of 100; similarly, strength of preference for perceiving can be assessed by the distance of the continuous SN score from 100. A comparison of these two values should indicate which of the two functions shows the stronger preference.

However, as Table 1 shows, when subjects were cross-classified by hypothesized dominant function and observed stronger preference, chi-

Table 1
Cross-Tabulation of Hypothesized Dominant Function by Observed Stronger Preference

Observed stronger preference	Hypothesized dominant function	
	Judging	Perceiving
Men^a		
Judging	42	72
Perceiving	65	80
Women^b		
Judging	35	46
Perceiving	48	68

Note. Data from 8 men and 4 women with tied preference scores are omitted.

a. Continuity-adjusted chi-square = 1.37, *ns*.

b. Continuity-adjusted chi-square = 0.01, *ns*.

square analysis showed no significant association for either men or women. It is possible that these results are due to the fact that the range for the SN score is greater than the range for the TF score, increasing the probability that all individuals will have a higher preference score on the perceiving function. To examine this possibility, both SN and TF scores were standardized to have a mean of 0 and a standard deviation of 1, the higher absolute value was taken to indicate a more clearly preferred function. Again, chi-square analysis failed to show a significant association with the hypothesized dominant function in either men or women. These data provide no support for the MBTI system as a means of assessing the Jungian dominant function.

To examine the configural effects of the MBTI classifications on normal personality dimensions, multivariate analyses of variance were performed on the five NEO-PI factor scores using the four MBTI dichotomies as classifying variables. A total of 55 two-, three-, and four-way interactions were thus examined. Overall *F* tests were significant for the main effects and for the EI \times JP interaction, but not for any of the 10 other two-, three-, and four-way interaction terms. Inspection of the univariate *F* tests for the EI \times JP interaction showed one significant effect. NEO-PI Neuroticism was particularly high among individuals who showed both I and P preferences. However, when examined within sex, this effect was significant only for women. These analyses do not support the hypothesis that personality traits will be affected by particular combinations of MBTI preferences into qualitatively distinct types. Instead,

Table 2
Mean Levels of NEO-PI Factor Scores for MBTI Preferences

NEO-PI factor	MBTI preference							
	E	I	S	N	T	F	J	P
Neuroticism	48.6	50.4*	49.4	49.7	47.7	52.8***	48.9	51.8
Extra- version	55.7	44.4***	48.8	50.5	48.7	51.1*	48.8	51.9**
Openness	50.4	50.2	45.1	56.9***	49.6	51.5	49.1	54.0***
Agreeableness	50.3	49.1	49.0	50.6	46.9	54.4***	49.5	50.2
Conscientiousness	48.7	49.8	49.9	48.5	50.3	47.6***	51.4	42.7***
N	214	254	264	204	297	171	357	111

Note: NEO-PI = NEO Personality Inventory; MBTI = Myers-Briggs Type Indicator. E = Extraverted, I = Introverted, S = Sensing, N = Intuitive, T = Thinking, F = Feeling, J = Judging, P = Perceiving.

* $p < .05$

** $p < .01$

*** $p < .001$

the four-letter type codes of the MBTI simply summarize four independent main effects.

Analyses were then repeated using contrasting MBTI preferences and gender as classifying variables. Because there were no Preference \times Gender interactions, only the main effects for preference need be considered; mean values for the NEO-PI factors (expressed as T scores) are given in Table 2. These findings show that individuals categorized as Introverts by the MBTI score slightly higher in NEO-PI Neuroticism and much lower in NEO-PI Extraversion; Intuitive types score higher in Openness to Experience, Feeling types score higher in Neuroticism, Extraversion, and Agreeableness, and lower in Conscientiousness, and Perceiving types score higher in NEO-PI Extraversion and Openness, and lower in Conscientiousness.

Analyses of Continuous Scores

Although several of these effects are large in magnitude, the typical analysis probably underestimates the true relations, because information is lost when the MBTI indices are dichotomized. A clearer picture can be seen when the continuous scale scores are used, and correlations between the MBTI scores and self-reported NEO-PI factors are given in

Table 3
Correlations of Self-Reported NEO-PI Factors With MBTI Continuous Scales in Men and Women

MBTI scales	NEO-PI factor				
	N	E	O	A	C
Men					
EI (Introversion)	16**	-.74***	.03	-.03	.08
SN (Intuition)	-.06	.10	.72***	.04	-.15*
TF (Feeling)	.06	.19**	.02	.44***	-.15*
JP (Perception)	.11	.15*	.30***	-.06	-.49***
Women					
EI (Introversion)	.17*	-.69***	-.03	-.08	.08
SN (Intuition)	.01	.22**	.69***	.03	-.10
TF (Feeling)	.28***	.10	-.02	.46***	-.22**
JP (Perception)	.04	.20**	.26***	.05	-.46***

Note N = 267 for men, 201 for women NEO-PI = NEO Personality Inventory, MBTI = Myers-Briggs Type Indicator N = Neuroticism, E = Extraversion, O = Openness to Experience, A = Agreeableness, C = Conscientiousness

* $p < .05$

** $p < .01$

*** $p < .001$

Table 3, for men and women separately. Note that the MBTI continuous scores are given in the direction of the second letter, that is, they measure introversion, intuition, feeling, and perceiving. For both men and women, the correlations between the two extraversion measures and between the MBTI SN index and NEO-PI Openness factor are around .7 in absolute magnitude, corrected for unreliability, they would approach unity. There are also substantial correlations between MBTI TF and NEO-PI Agreeableness and between JP and Conscientiousness in both sexes.

Among both men and women there is a modest correlation between the JP scale and Openness, which is understandable in view of the correlation between JP and SN. Among women, Intuition shows a small association with NEO-PI Extraversion, and feeling preference is related to higher Neuroticism and lower Conscientiousness. In general, however, the pattern of correlations is very similar for men and women.

Table 4 gives correlations between NEO-PI factor scores derived from mean peer ratings with the self-reported continuous MBTI scores for men and women separately. Results provide strong cross-observer repli-

Table 4
Correlations of Peer-Rated NEO-PI Factors With MBTI Continuous Scales in Men and Women

MBTI scales	N	NEO-PI factor			
		E	O	A	C
Men					
EI (Introversion)	05	– 34**	15	10	17
SN (Intuition)	07	06	61***	– 27*	– 15
TF (Feeling)	– 11	22	01	25*	– 16
JP (Perception)	– 10	11	04	– 10	– 34**
Women					
EI (Introversion)	08	– 38*	– 04	– 03	– 02
SN (Intuition)	16	09	41*	– 01	– 04
TF (Feeling)	15	– 01	– 06	46**	– 39*
JP (Perception)	12	00	18	11	– 55***

Note $N = 70$ for men, 35 for women NEO-PI = NEO Personality Inventory, MBTI = Myers-Briggs Type Indicator N = Neuroticism, E = Extraversion, O = Openness to Experience, A = Agreeableness, C = Conscientiousness

* $p < .05$

** $p < .01$

*** $p < .001$

cation of the findings seen within self-reports in Tables 2 and 3. In both men and women, EI is significantly (negatively) correlated with peer-rated Extraversion, SN with peer-rated Openness, TF with peer-rated Agreeableness, and JP (negatively) with peer-rated Conscientiousness. Two other correlations are significant, but not replicated across gender. Men who score in the Intuitive direction are seen by peers as being lower in Agreeableness, and women who score in the Feeling direction are seen as being lower in Conscientiousness. Note that none of the MBTI indices is related to peer-rated Neuroticism.

The relations shown in Tables 3 and 4 were replicated when alternative measures of the five factors were examined in subsets of subjects. The EI index was correlated with Extraversion factors from the CQS ($r = -.58$, $N = 168$, $p < .001$) and the adjective checklist ($r = -.62$, $N = 191$, $p < .001$), the SN index with Openness factors ($r_s = .56$ and $.54$), the TF index with Agreeableness factors ($r_s = .46$ and $.32$), and the JP index with Conscientiousness factors ($r_s = -.29$ and $-.28$, all $p_s < .001$). These correlations suggest that the correspondences between the MBTI and the NEO-PI are generalizable to other measures of the five-factor model that do not rely on standard questionnaire format.

Scatterplots of the significant relations in Tables 3 and 4 were examined visually for evidence of deviations from linearity or discontinuity at the transition point between contrasting types. None was apparent.

Finally, the MBTI TF scale was correlated with two relevant facets of Openness to Experience that provide a test of the distinctive orientations of thinking and feeling. As hypothesized, a preference for feeling was directly related to Openness to Feelings in both self-reports ($r = .30$, $N = 468$, $p < .001$), and peer ratings ($r = .24$, $N = 105$, $p < .05$), it was inversely related to Openness to Ideas ($r_s = -.16$, $p < .001$, and $-.21$, $p < .05$, for self-reports and peer ratings, respectively). Thus, although the TF scale appears chiefly to measure aspects of the domain of Agreeableness, it does show some ability to differentiate between orientations toward thinking and feeling.

DISCUSSION

The results of the present study provide the basis for a very mixed evaluation—or a radical reinterpretation—of the MBTI. Consistent with much previous research (especially Stricker & Ross, 1964a), the study found no support for the typological theory the instrument is intended to embody. There was no evidence that preferences formed true dichotomies, the 16 types did not appear to be qualitatively distinct, because analyses of their joint effects on personality dimensions showed that only 1 of 55 interactions was significant, and only in women, and, contrary to hypothesis, the theoretically dominant function was no more clearly preferred than the auxiliary. The Jungian prediction that opposing functions should be developed in later life was not confirmed using the MBTI. The correlates of individual scales were consistent with their item content, but would probably not have been predicted from Jungian theory. From the perspective of construct validation, the MBTI appears to have very serious problems. Weighing the evidence to date, the MBTI does not seem to be a promising instrument for measuring Jung's types, those who embrace Jung's theory should probably avoid the MBTI.

Conversely, those who have found the MBTI to be a useful instrument for assessing and describing individual differences should seriously consider abandoning Jungian theory and some of the associated language. Yet how can the MBTI be interpreted or employed without reference to Jung's psychological types? One alternative is to adopt the perspective of the five-factor model of personality. Each of the four indices showed

impressive evidence of convergence with one of the five major dimensions of normal personality, whether assessed through self-reports or peer ratings. It is these convergences that probably account for the many meaningful associations between MBTI scales and external criteria such as occupational preferences, creativity, and educational performance.

The correspondences seen in the present study are generally consistent with the body of literature on the correlates of the MBTI (see Myers & McCaulley, 1985, pp. 175–223). For example, the SN index, which is highly correlated with Openness to Experience in the present study, is also related to the Sixteen Personality Factor Questionnaire (16PF, Cattell, Eber, & Tatsuoka, 1970) Intelligence, Tender-Mindedness, Imaginativeness, and Radicalism scales, which are known to form an openness factor (McCrae & Costa, 1985b). Studies summarized in the MBTI manual showing that creativity is characteristic of intuitive types are consistent with recent evidence that most personality variables related to creativity measure aspects of Openness to Experience (McCrae, 1987). Again, the JP scale seems from the current perspective to measure an aspect of Conscientiousness, and the manual shows that it is related to other measures of orderliness and self-discipline, such as 16PF Control and Superego Strength.

The view of the MBTI indices provided by the five-factor model explains some anomalous correlations reported in the manual. For example, one might suppose that the Thinking Introversion scale of the Omnibus Personality Inventory (OPI, Heist, McConnell, Webster, & Yonge, 1963) would be related to Thinking and to Introversion; in fact, it is virtually unrelated ($r_s = .10$) to either the EI or the TF index. However, it is strongly related ($r = .53$) to the SN index. These relations make sense if Thinking Introversion is viewed as a form of thoughtfulness or openness to ideas. The Thinking Introversion factor of the Guilford-Zimmerman Temperament Survey (Guilford, Zimmerman, & Guilford, 1976) is known to load on a broader Openness to Experience factor (Costa & McCrae, 1985a).

Similarly, a reinterpretation of the MBTI scales can make better sense of some of the reported correlates of the TF index. TF is positively related to needs for Affiliation, Blameavoidance, Nurturance, and Succorance on Stein's (1966) Self-Description Questionnaire, and negatively related to needs for Aggression, Counteraction, and Dominance. These correlations could not be predicted from Jung's definitions of thinking and feeling functions, but are easily understood within the broader con-

struct of Agreeableness. The TF index emphasizes a cognitive style associated with Agreeableness, the Stein scales represent interpersonal aspects of the same broad domain.

The five-factor model is purely descriptive, it does not explain the origins of personality nor the mechanisms that account for individual differences. Can Jungian psychology provide a theoretical basis for any of the factors? In particular, can individual differences in Openness and Agreeableness, respectively, be attributed to different styles of perceiving and judging? A brief examination of this possibility raises some doubts. Although openness is related to perception in the broad sense of taking in information, the contrast between sensation and intuition does not seem to capture the essence of openness. Open individuals use their five senses as much or more than closed individuals, they differ not in the type of information they prefer, but rather in the quantity. Similarly, agreeable people differ from antagonistic people not simply in a preference for feeling over logic, but in a preference for warm feelings over cold logic. Other psychologists, however, may perceive deeper connections between Jungian theory and the five-factor model, further exploration of this issue would be welcome.

The dimensional model offered here as an alternative to a Jungian typology may seem deficient in another respect. In their critique of the earlier three-dimensional NEO trait model, Whitbourne and Weinstock (1986) argued that "What is still lacking . . . is a set of predictions concerning the interrelationships among the three dimensions and different combinations of scores on the three personality factors" (pp. 224–225). The MBTI types attempt to satisfy the need to consider the whole pattern of traits and summarize personality in a single comprehensive Gestalt. In fact, however, there is no evidence that MBTI types represent unique configurations, they merely summarize four additive main effects. INTJs differ from ENTJs only in the ways that introverts differ from extraverts, EI does not interact with the other indices to form qualitatively new combinations.

The fact that personality dimensions do not appear to interact to form distinct types of persons does not mean that traits do not interact with one another and with situations in determining behavior. At a social gathering the anxious introvert may worry about meeting strangers, the anxious extravert may worry about being left alone. These interactions, however, are dynamic determinants of the ongoing flow of behavior, and are not useful in characterizing the individual.

Some Implications for the Interpretation of the MBTI

There are numerous books, chapters, and pamphlets devoted to an explanation of the MBTI types for use by counselors, personnel psychologists, educators, and laypersons. They describe the 16 cells individually or in subgroups (e.g., *Introverted Thinkers*). The descriptions are based in part on Jungian theory, in part on the item content of the indices, and in part on empirical research or personal experience with the types. How well these descriptions square with known correlates of the indices can be roughly gauged by substituting the corresponding factor names from Table 3 for the MBTI codes. For example, the ENFJ type is, in terms of the five-factor model, *extraverted, open, agreeable, and conscientious*. Myers and McCaulley's (1985, p. 21) description of individuals of this type appears to fit *extraverted, agreeable, and conscientious* individuals (although there is little in the description suggesting openness). Most of the descriptions provided in the manual seem to be reasonably good by this criterion.

However, the accompanying assertions about the dominance of particular preferences in inner and outer life are based solely on Jungian theory and on the use of the JP and EI scales to determine the dominant function, and are not supported by data. There is no good evidence that the JP scale has any bearing at all on the relative importance of thinking or perceiving. However, MBTI users might wish to reconceptualize the JP scale as an index of preference for structured versus spontaneous living; this view is supported by the item content and the external correlates.

The use of dichotomous preference scores is also questionable, as many reviewers have noted. Some authors (e.g., Keirsey & Bates, 1978) have taken the reality of the dichotomies so seriously that they estimate their numbers in the population—surely an unwarranted reification. In interpreting scores, Myers (1980) advised individuals to explore closely related types (differing in one or two letters) to see if a better fit could be found. In fact, however, most individuals will probably accept at face value whatever description is provided. This system errs in two ways: by misclassifying many of the individuals who are near the cutting point, and by failing to note the large differences that may be found within type between those with strong and weak preferences. At one time, tied scores were designated by an "x" in the type code (e.g., ExTJ); it might be useful to restore this practice, classifying everyone in the middle third

or so of the distribution on each index as an "x" Data on the retest stability of types (Table 10.7 of the manual) show that such a policy could substantially increase reliability

Merits of Alternative Instruments and Approaches

Most personality inventories report scores in terms of continuous scales, using all available information. MBTI users have this option, by attending to the preference scores or continuous scores. A comparison of the MBTI with the NEO-PI, however, suggests some ways in which MBTI users might benefit from the supplementary use of other personality instruments. Most conspicuous is the lack of a Neuroticism factor in the MBTI. Its absence is understandable on two counts: first, because emotional instability versus adjustment did not enter into Jung's definitions of the types, and second, because the authors of the test were apparently philosophically committed to a position which saw each type as equally valuable and positive (Myers with Myers, 1980)—a view that is difficult to hold with regard to Neuroticism.³ Although it makes interpretation of results palatable to most respondents, this approach also omits information that may be crucial to employers, co-workers, counselors, and the individuals themselves. For many, if not most, applications, some measure of Neuroticism would be useful.

Further, the MBTI does not give comprehensive information on the four domains it does sample. The TF scale, for example, encompasses the tough- versus tender-minded aspect of Agreeableness, but has no direct measures of interpersonal aspects such as trust, altruism, and cooperativeness. All four indices give only a broad, global picture, without any distinctions of traits within each domain. Other personality measures give more detail. For example, the NEO-PI provides information on six specific facets of Extraversion—Warmth, Gregariousness, Assertiveness, Activity, Excitement Seeking, and Positive Emotions. This is especially important for understanding individuals who score in the average range on overall extraversion. Individuals who are good leaders but relatively sober and serious may score the same as others who are cheer-

3 To a lesser extent, the same criticism applies to the TF and JP indices. Descriptions downplay the antagonistic side of Thinking types and the lazy and disorganized side of Perceiving types.

ful and jovial, but would rather let others make decisions. Such differences would be important in a variety of applied settings, and show the potential value of supplementing the MBTI with other measures.

There are two ways in which the users of other psychological tests can benefit from experience with the MBTI. First, translation of the MBTI indices into the common language of the five-factor model makes it possible to assimilate the extensive empirical literature on the MBTI. For example, dozens of occupations have been classified with respect to the frequency of MBTI preferences (Myers & McCaulley, 1985). Intuitive types are disproportionately found in such occupations as artist, writer, and psychologist, whereas sensing types choose vocations such as farmer, mechanic, or clerical worker. When the SN index is interpreted as a measure of Openness to Experience, these data provide valuable replications of other work linking Openness to vocational preferences (Costa, McCrae, & Holland, 1984).

At another level, those who develop and employ personality measures can learn a good deal from the strategies of application that have been used with the MBTI. Decades of experience show that it is possible and sometimes useful to describe personality in lay terms, to teach individuals the nature and value of individual differences, and to increase understanding among people who interact by sharing information on personality and explaining differences in styles. Adapting such approaches to instruments that include measures of ostensibly undesirable traits such as Neuroticism will require tact and skill, but promises to be valuable in the long run. Regardless of the instrument used, information given to laypersons should reflect current knowledge in personality psychology. If the MBTI is used, evidence to date suggests that it may be better to abandon its Jungian framework and reinterpret the MBTI in terms of the five-factor model.

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