

ACQUIESCENCE AND THE FACTORIAL INTERPRETATION OF THE MMPI¹

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The operation of reliable response sets or stylistic consistencies has been frequently noted on personality and attitude scales with a true-false or agree-disagree format (cf. Cronbach, 1946, 1950; Fricke, 1956; Messick & Jackson, 1958). It has recently been conjectured (Jackson & Messick, 1958) that the major common factors in personality inventories of this type are interpretable primarily in terms of such stylistic consistencies rather than in terms of specific item content. The present paper attempts to annotate the influence of two response styles, the tendency to agree or acquiesce and the tendency to respond in a desirable way, using the Minnesota Multiphasic Personality Inventory (MMPI) as an example of inventories with this general response form. In particular, a high correlation will be noted between factor loadings on the largest factor, as obtained in several published factor analyses of the MMPI, and certain indices of acquiescence.

Barnes (1956b), in evaluating the Berg (1955) deviation hypothesis on the MMPI, found that the tendency to answer atypically or deviantly "true" was highly correlated with

scores on the psychotic scales, and the tendency to answer atypically "false" was highly correlated with the neurotic triad. This result is consistent with the fact, noted by Cottle and Powell (1951) and others (Barnes, 1956b; Fricke, 1956), that a large proportion of MMPI psychotic items are keyed true and a large proportion of neurotic items keyed false, suggesting that differential tendencies to respond atypically "true" and "false" might have been involved in the discrimination of criterion groups upon which the scoring keys were based. Barnes (1956a) also pointed out a marked similarity between the correlations of MMPI scales with these two deviant response tendencies and factor loadings for the scales on the two major factors reported by Wheeler, Little, and Lehner (1951); he concluded that the number of atypical true answers is a "pure factor test" of the first or "psychotic" factor and that the number of deviant false answers has a high loading on the second or "neurotic" factor. The two major MMPI factors obtained by Welsh (1956) also displayed a similar pattern of loadings, and it is noteworthy that the "pure factor" reference scale *A* which Welsh developed for his first or "anxiety" factor had 38 out of 39 items keyed true, while the reference scale *R* for the second or "repression" factor had all 40 of its items keyed false.

In view of the striking similarity between the effects of consistent tendencies to respond "true" and "false" and patterns of factor loadings obtained in two studies of

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MMPI scales, all factor analyses of the MMPI readily available in the literature were reviewed, in order to evaluate the possible relationship between each scale's factor loading on the major factor and an index of its potential for reflecting acquiescence. The particular index of acquiescence used was the proportion of items keyed true on each scale, which, assuming that the acquiescence-evoking properties of items are uniform over all MMPI scales, can be considered to reflect the extent to which total scores on a scale are influenced by consistent tendencies to respond "true." High scores on a scale with a large proportion of items keyed true would thus be assumed to reflect a general tendency to acquiesce, in addition, of course, to the contribution of other stylistic tendencies and of systematic content responses. Jackson (1960) used this index to evaluate the effects of acquiescence on the California Psychological Inventory, and Voas (1958) used the proportion of items keyed false as a criterion for constructing response bias scales. Voas (1958) also estimated loadings for scales from the MMPI and the Guilford-Zimmerman Temperament Survey on a factor marked by two measures of the tendency to respond "false" and found that these loadings correlated .86 with the proportion of items keyed false on each scale. These findings support the use of the index in the present context.

Factor loadings for MMPI scales were obtained from eight studies by Abrams (1949, summarized by French, 1953), Cook and Wherry (1950), Cottle (1950), Tyler (1951), Wheeler, Little, and Lehner (1951), Welsh (1956), Slater (1958), and Kas-sebaum, Couch, and Slater (1959). A fairly uniform finding from these

studies is that only two major factors and two or three minor ones are necessary to account for interrelations among the scales. Spearman rank correlations were computed between loadings on the largest factor in each study and the proportion of items keyed true on each scale; the results are summarized in Table 1. In some of the factor analyses, values were not reported for scales with small loadings on the factor, so in computing correlation coefficients these scales were considered to be tied at an appropriate rank below scales with reported positive loadings and above scales with reported negative loadings. Corrections for ties (cf. Siegel, 1956) were computed for two of the studies with the most scales tied at the same rank (Wheeler, Little, & Lehner's normal sample and Tyler's sample), but the coefficients changed only .01.

Of 11 different subject samples represented in these eight studies, significant correlations were obtained for 8 of them, four of the coefficients exceeding .85. These strikingly consistent findings indicate that in most of these studies the largest factor on the MMPI is interpretable in terms of acquiescence. In evaluating the few apparently inconsistent results, it is important to note that for Abrams's (1949) neurotic sample, the correlation with the largest factor was $-.15$, but with the second largest it was $.52$. Also, in Tyler's (1951) study the correlation with the largest rotated factor was $.33$, but with the unrotated first centroid it was $.52$, $p < .05$. These findings suggest that for those studies in which the correspondence between the proportion of items keyed true and the factor loadings was not close, the factor structures could have been rotated to produce a higher correlation. Ana-

TABLE 1

SPEARMAN RANK CORRELATION (ρ) BETWEEN FACTOR LOADINGS ON THE LARGEST MMPI FACTOR AND PROPORTION OF ITEMS KEYED "TRUE" ON EACH SCALE

Study	Scales Included	Sample	ρ
Abrams, 1949	11 scales: <i>L, F, Hs, D, Hy, Pd, Mf, Pa, Pt, Sc, Ma</i>	117 normal male veterans	.907**
		201 neurotic male veterans	-.148 (largest factor) .516 (2nd largest)
Cook & Wherry, 1950	11 scales: <i>L, F, Hs, D, Hy, Pd, Mf, Pa, Pt, Sc, Ma</i>	111 male naval submarine candidates	.605*
Cottle, 1950	11 scales: <i>L, F, Hs, D, Hy, Pd, Mf, Pa, Pt, Sc, Ma</i>	400 male veterans	.916**
Tyler, 1951	15 scales: <i>Hs, D, Hy, Pd, Mf, Pa, Pt, Sc, Ma, Si, St, Pr, Ac, Re, Do</i>	107 female graduate students	.328
Wheeler, Little, & Lehner, 1951	12 scales: <i>L, K, F, Hs, D, Hy, Pd, Mf, Pa, Pt, Sc, Ma</i>	112 male college students	.558
		110 male neuropsychiatric patients	.874**
Welsh, 1956	11 pure scales: <i>K', Hs', D', Hy', Pd', Mf', Pa', Pt', Sc', Ma', Si'</i>	150 male VA general hospital patients	.870**
	11 pure scales plus <i>A, Gm, Ja, R</i>	Same 150 males	.897**
Slater, 1958	43 scales: <i>L, F, K, Hs, D, Hy, Pd, Mf, Pa, Pt, Sc, Ma, Si, Nm, Dp, Fm, A, R, Im, Pr, To, C, P, Sp, Rp, Sy, Re, Si, Lp, Do, Es, Ie, Ac, Ai, O-I, Lb, Ne, Ca, Ph, Ht, Chl, Zi, Zs</i>	102 aged males	.728**
		109 aged females	.718**
Kassebaum, Couch, & Slater, 1959	32 scales: <i>L, F, K, Hs, D, Hy, Pd, Mf, Pa, Pt, Sc, Ma, Si, Es, Ie, Lp, Ai, Sy, Ac, Re, Do, Pr, St, Im, Sp, Fm, Rp, R, A, Dp, To, OI</i>	160 Harvard College freshmen	.625**

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

lytical procedures similar to the computation of B weights in multiple correlation analysis are available (Mosier, 1939) for rotating to maximize the correlation between a factor and a criterion, which in this case would be a vector of proportions of true items. However, an adequate application of this technique requires loadings for all the scales on the factors under consideration, and for those studies providing this information (e.g., Welsh, 1956) there was usually little need to rotate.

Another consideration which suggests that a rotation of axes might clarify the role of acquiescence on the MMPI is the fact that scales with high loadings on the second largest MMPI factor usually tend to have a high proportion of false items in their

keys. Kassebaum, Couch, and Slater (1959) noticed this in their factor results and suggested that their second factor partly reflected a general tendency to respond "false." Although correlations between the proportion of items keyed true and loadings on the second MMPI factor are usually not nearly as high as correlations with the first factor, some significant coefficients occur; e.g., the correlation between the proportion of items keyed true and loadings on the second factor in the study by Kassebaum, Couch, and Slater (1959) was $-.44$, $p < .05$ with 30 *df*, and in Welsh's (1956) study it was $-.64$, $p < .05$ with 13 *df*.

This result is consistent with Barnes' (1956a) finding of a correspondence between atypical true

answers and the first MMPI factor and atypical false answers and the second factor. Since these two factors are usually orthogonal, this correspondence might be considered evidence for two relatively independent response biases, one a tendency to agree and the other to disagree. Such a contention is consistent with Barnes' (1956b) finding of a correlation of .11 between deviant responses answered "true" and "false" and with the fact that Welsh's (1956) *A* and *R* scales are usually only slightly negatively correlated. Although these results cannot be accounted for by a simple response set of acquiescence, it is not necessary to postulate two independent sets to agree and to disagree. As has been pointed out (Jackson & Messick, 1958), all that is required to account for the findings is the operation of at least one other factor in conjunction with acquiescence. Thus, the *A* scale can have a high positive loading on an acquiescence factor and the *R* scale a high negative loading, yet the two scales could be uncorrelated if they both had positive, or negative, loadings on some other dimension. Other factors which could moderate the operation of acquiescence on the MMPI might be specific content dimensions or some other response style. As previously suggested (Jackson & Messick, 1958), a particularly likely candidate for such a role is the stylistic tendency to respond in a desirable way.

Possible influences on MMPI scores of a set to respond desirably have been widely documented (cf. De Soto & Kuethe, 1959; Edwards, 1957; Fordyce, 1956; Hanley, 1956, 1957; Jackson & Messick, 1958; Taylor, 1959; Wiggins & Rumrill, 1959). Fordyce (1956), for example, has noted a marked similarity between

loadings on the largest MMPI factor from Wheeler, Little, and Lehner's (1951) psychiatric sample and correlations of MMPI scales with a measure of desirability. In fact, the rank correlation between the loadings and the correlation coefficients is approximately $-.75$, and since the proportion of items keyed true on each MMPI scale correlates only about $-.50$ with the desirability coefficients, it seems likely that a combination of desirability and acquiescence would lead to even better prediction of the factor (cf. Messick, 1959). Although this and some other reported relationships are somewhat equivocal because the measures of desirability used were partially confounded with acquiescence, e.g., Edwards' *SD* scale and Hanley's *Ex* scale, high correlations have also been reported between MMPI scales and desirability measures having a balanced number of true and false items (Edwards, 1957; Hanley, 1957; Wiggins & Rumrill, 1959).

In an attempt to take these findings into account, it is suggested that the acquiescence-evoking properties of items are not, as assumed above, uniform over all scales, but that acquiescence is elicited differentially as a function, perhaps, of specific item content, of the clarity or ambiguity with which the content is stated, and in particular of the perceived desirability of the statement. In the extreme, it is suggested that the two major factors usually found for the MMPI may be rotated into positions interpretable as two response styles—the tendency to acquiesce and the tendency to respond desirably. The negative poles of these dimensions would be the tendencies to disagree and to respond undesirably, respectively. Response vari-

ance on MMPI scales would then be primarily a function of these two stylistic components in various weighted proportions. Studies including independent marker variables for the two styles are of course required to identify the factor positions. Much research is also needed into the precise nature of the set to respond desirably, particularly in view of three complicating results: (a) the finding of consistent individual differences in judgments of desirability (Messick, 1960); (b) the distinction between personal and social desirability (Borislow, 1958; Rosen, 1956); and (c) the differentiation between a

tendency to endorse certain desirable items which exhibit large mean shifts under desirability instructions and the tendency to endorse other desirable items which presumably reflect a group norm (Voas, 1958; Wiggins, 1959).

In conclusion, the findings offer clear evidence that acquiescence, as moderated by item desirability, plays a dominant role in personality inventories like the MMPI. Focused empirical investigations are required to develop a refined interpretation of these and other stylistic consistencies in terms of personality organization and psychopathology.

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