

A PSYCHOMETRIC ANALYSIS OF THE INTERNAL-EXTERNAL CONTROL SCALE

TERRY JOHN PROCIUK

A dissertation submitted to the Faculty of Graduate Studies
in partial fulfillment of the requirements for
the degree of

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To my mother and father

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ABSTRACT

Although research has demonstrated the importance of internal-external locus of control as a personality determinant of behavior, a number of recent studies have questioned the psychometric characteristics of the most widely-used measure of this construct; the Rotter Internal-External Control (I-E) scale. Consistent with such research, the present investigation, consisting of four interrelated experiments, was conducted to examine several fundamental psychometric properties of the I-E scale.

In Experiment 1, the factorial invariance of the I-E scale was evaluated. Factor analyses of item responses yielded a two-factor structure for both male and female subjects. The factors were designated as Fatalism and Social Political Control. In subsequent analyses, four measures of factorial invariance (i.e., correlation of factor loadings, coefficient of congruence, salient variable similarity index, and Kaiser relate method) were used to compare the obtained factor structures as well as those reported in previous research employing male and female samples from Canadian, American, and Australian student populations. Obtained results demonstrated a relatively high degree of consistency in the two-factor structure of the I-E scale across populations within sexes, within populations between sexes, and within a population within sexes.

Two experiments were conducted to examine whether the theoretical conceptualization of locus of control as a bipolar dimension is reflected in its measurement by the I-E scale. In Experiment 2, the 46 internal and external control statements comprising this measure were scaled in terms of Rotter's theoretical definition of locus of control. Subsequent comparisons of the scale values of paired internal and external control statements, ob-

tained from successive internal scaling analyses, indicated that only 9 of the 23 items consist of statements which constitute opposite ends of a bipolar dimension. In a further evaluation of I-E scale bipolarity, the statements were scaled in terms of the Fatalism and Social Political Control dimensions identified by previous factor analytic research. Results of Experiment 3 demonstrated significant dimensional differences between the scale values of statements referring to fatalism versus social political control expectancies. However, an examination of I-E scale bipolarity, employing dimension-specific scale values, yielded overall findings which were similar to those of Experiment 2. Of the 23 items, only 10 were shown to consist of statements representing opposite ends of a bipolar continuum.

In Experiment 4, the homogeneity of the I-E scale was evaluated by determining the proportion of total scale variance due to person, item, and remainder components. Results of this analysis, for male and female subjects, demonstrated that the remainder component which reflects idiosyncratic responding accounted for the majority of the variance (i.e., approximately 74%) while persons and items each accounted for about 13% variance. Further calculation, redefining items as situations, involved a partitioning of total scale variance into the relative contributions of persons, situations, and person X situation interaction. Obtained results, for males and females, indicated that person X situation interaction accounted for approximately 33% of the total scale variance while persons and situations accounted, on the average, for 9% and 8% variance, respectively. Such findings suggest that locus of control expectancies are not uniform and invariant across all situations and that the heterogeneous item content of the I-E scale imposes a restriction on the reliability of this personality meas-

ure.

Issues including generalizability of the present findings, methodological limitations, and implications for future use of the I-E scale were considered. Several topics for further research were identified and a multidimensional approach to locus of control measurement was suggested. Finally, results of the present investigation were compared to those typically obtained in the general area of personality measurement.

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CHAPTER I

INTRODUCTION

Since the introduction of the internal-external locus of control construct (Rotter, 1966), a substantial amount of research has been conducted examining the relationships between this personality dimension and numerous other personality and behavioral measures. Recent literature reviews (e.g., Joe, 1971; Lefcourt, 1972; Phares, 1973, 1976) and research bibliographies (e.g., Prociuk & Lussier, 1975; Thornhill, Thornhill, & Youngman, 1975) indicate that over 1500 studies on locus of control have been reported during the period from 1966 to 1975. Today, even a casual glance at the research literature reveals a considerable amount of continued interest in this personality construct. Reported research findings indicate that internal-external control has proven to be useful in predicting a variety of behaviors, and the relationships found between this construct and certain important social variables have undoubtedly contributed significantly to its present popularity as an area of personality research. For example, internal-external control has been shown related to such diverse criteria as job involvement (Durand & Shea, 1974; Runyon, 1973), belief in supernatural phenomena (Scheidt, 1973), personal adjustment (Miller & Seligman, 1973; Warehime & Foulds, 1971), study habits and attitudes (Prociuk & Breen, 1974), birth control (MacDonald, 1970; Segal & DuCette, 1973), and learned helplessness (Hiroto, 1974). However, despite the obvious importance of this personality dimension for understanding human behavior, a number of recent investigations (e.g., Hjelle, 1971; Kleiber, Veldman, & Menaker, 1973; Klockars & Varnum, 1975; Levenson, 1974; Reid & Ware, 1973, 1974) have suggested several possible weaknesses in the most

widely used measure of this construct; the Rotter (1966) Internal-External Control (I-E) scale.

Consistent with such research, the present investigation attempts to provide information on a number of psychometric properties of the I-E scale. Specifically, the present research consists of four interrelated experiments which focus on the following characteristics of this personality measure: factorial invariance, bipolarity, and homogeneity. Although recent factor analytic research has consistently demonstrated the presence of two independent factors in the I-E scale, questioning the unidimensional assumption, the factorial invariance of this factor structure has not been demonstrated. Therefore, Experiment 1 evaluates the factor analytic findings of comparable solutions based on Canadian (Abrahamson, Schludermann, & Schludermann, 1973), American (Mirels, 1970), and Australian (Viney, 1974) subject samples employing several different measures of factorial invariance (see Gorsuch, 1974). Experiment 2 represents an initial attempt at examining the assumption of item bipolarity in the I-E scale. Specifically, the 46 statements comprising the 23 forced-choice I-E items are scaled employing the method of successive internals (Edwards, 1957, 1970), and the scale values of the internal and corresponding external statements are compared to determine whether they represent equivalent degrees of internal control and external control, respectively. Experiment 3 extends the analyses of the previous study in a number of directions. This study includes a scaling of the I-E statements on two dimensions, Fatalism and Social Political Control, as identified by previous factor analytic research. Subsequently, the bipolarity assumption is examined on the basis of multiple scale values. Also, the unidimensional assumption of the I-E

scale is re-examined from a scaling methodology perspective and the results are compared to those of factor analytic research (Edwards, Note 2). In Experiment 4, the homogeneity of the I-E scale is examined by determining the variance components of this measure and, correspondingly, by evaluating the extent of idiosyncratic responding to scale items. The specific analyses include a partitioning of the variance in I-E scores into person, item, and remainder components (Fiske, 1963, 1966, 1971) from the single administration case, to a subsequent specification of the person X item component (i.e., idiosyncratic responding, Fiske, 1971; "higgledy-piggledyness", Walker, 1931) from the two administration case (e.g., Endler, 1966; Rogan, Note 6; Vaughan & Corballis, 1969).

Since the development of the I-E scale, a number of researchers (e.g., Hersch & Scheibe, 1967; Joe, 1971; Lefcourt, 1972; Phares, 1973; Tyre, 1972) have indicated that in spite of the considerable amount of research substantiating its usefulness, further improvements and additional psychometric data on this personality measure are required. In its present form, the I-E scale may be considered as providing a somewhat crude measure of generalized expectancies for reinforcement with, for example, the often employed distinction between internal and external control confounded by the multiplicity in the meaning of externality (e.g., Abramowitz, 1973; Levenson, 1974). Therefore, a specific objective of this research is to provide information concerning the overall structure of this measure, and data specific to individual items so that a subsequent revision, refinement, or extension of the scale might result in providing finer discriminations of belief in internal versus external control expectancies.

Within the broader context of personality theory and measurement, the

present research is seen related to some of the issues recently discussed in the controversy involving the personologist, situationist, and interactionist approaches to personality (e.g., Ekehammar, 1974). Specifically, a primary criticism of the traditional trait (i.e., personologist) approach has been that the various measures of generalized dispositions account for only a trivial amount of the variance in the behaviors under investigation (e.g., Mischel, 1968, 1969). As Sarason, Smith, and Diener (1975) indicate, "what has aroused controversy has not been the abstract idea that individual differences by themselves and in interaction with environmental variables influence behavior, but the success with which existing assessment methods provide meaningful measures of individual differences" (p.199). Therefore, a more general objective of this research is to demonstrate the need and importance of employing a variety of psychometric procedures when developing, evaluating, or refining measures of personality dimensions.

Consistent with the views of Sarason et al. (1975), it is suggested that the measurement of individual differences continues to be an important issue in personality research and the incorporation of both dispositional and situational variables into experimental designs (i.e., an interactionist approach) may be the paradigm which will ultimately result in the greatest epistemic yield for the study of personality. Although the concept of interactionism is not new (Ekehammar, 1974), it has recently been more explicitly restated (e.g., Bowers, 1973; Endler, 1973, 1975) as part of the personologism-situationism-interactionism controversy. In an attempt to place the objectives of the present research into a somewhat broader perspective and to establish its relationship to that of current personality research, some of the more important recent theoretical and methodo-

logical statements within this controversy are summarized.

Current Issues in Personality Research

Situational specificity versus cross-situational consistency. In recent years, a number of important and influential accounts (Mischel, 1968, 1969, 1971) have questioned the viability of the traditional assumptions of personality psychology. Previously, much of the research in this area of psychology had been dominated by two main approaches; trait theories (e.g., Allport, 1966; Cattell, 1950), and psychodynamic theories (e.g., Freud, 1959; Rapaport, 1959). According to Mischel (1968), the two approaches share a number of common assumptions. Specifically, both dynamic and trait theories focus on responses as signs of pervasive underlying mental structures and both assume that underlying inferred dispositions (e.g., traits, states, motives) exert generalized and enduring causal effects on behavior. Guided by these assumptions, personality research has typically involved a search for broad underlying dimensions, for basic factors, or for enduring motives. Concomitantly, in personality measurement, this approach has led to the development of numerous tests (e.g., personality scales, projective measures) to assess generalized behavioral dispositions.

A central issue in the recent evaluation of the traditional approaches has been the accumulating evidence that conventional concepts and measures fail to account for much of the complexity and intricacy of human behavior (Reid, Note 5). Mischel (1968) notes, for example, that the correlation coefficients between measures of underlying personality dispositions and behavioral criteria usually range from .20 to .40 and are typically about

.30. Since a correlation of .30 accounts for only about 10% of the relevant variance, this amount has been regarded as negligible. Mischel (1968) emphasizes that "these weak associations, accounting for a trivial amount of variance, become understandable when the enormous variance due to situationally specific variables that determine the consequences for behavior in any particular context is recognized" (p. 83).

In contrast to the trait and psychodynamic approaches which assume cross-situational consistency, Mischel (1971) notes the importance of situational determinants of behavior stating that "a person will behave consistently across situations only to the extent that similar behavior leads, or is expected to lead, to similar consequences across those situations" (p. 74). According to social behavior theory, behaviors become generalized only to the extent that they are uniformly reinforced across many stimulus conditions. However, since many social behaviors are not reinforced uniformly across different situations discrimination learning occurs, i.e., behaviors tend to become discrete and controlled by relatively independent causes and maintaining conditions. Consequently, even subtle changes in the situation alter expectancies about the probable consequences of behavior. Therefore, behavior is considered situationally-specific (Mischel, 1968, 1969, 1971).

While advocating situationism, Mischel (1969) acknowledges that the issue of consistency versus specificity is a complex one since the discriminativeness found in behavior is not so great that continuity in persons' behaviors cannot be recognized. For example, there is substantial evidence that persons' cognitive constructions about themselves and the world are often stable and highly resistant to change (e.g., self concept, impression

formation). Research, moreover, has demonstrated impressive consistencies for intellectual functions of personality, and for behavior patterns such as cognitive styles and problem-solving strategies, which are strongly correlated with intelligence (e.g., Witkin, 1965). Consistency has also been found when individuals rate their own traits as in questionnaires and self-reports (e.g., Kelly, 1955), or when individual behavior is sampled at different times but in similar situations. However, when research has focused on personality and interpersonal behavioral variables, consistency evidence has been much more difficult to establish. Also, when personality has been sampled by diverse methods and not just by self-report inventories, the data have tended to undermine the utility of inferring global personality dispositions from behavioral signs (Mischel, 1968).

Evidence of observed instability and inconsistency in behavior has often been interpreted by trait and psychodynamic proponents as reflecting imperfections in the tests and measures resulting in unreliability and error of measurement. In response, Mischel (1968) notes that the interpretation of correlation coefficients does depend on a number of considerations. For example, a test may be reliable at one score level but unreliable at another. Also, reliability coefficients are influenced by the relative homogeneity in the tested behavior range of the subject sample. However, while acknowledging that these and other sources of error (e.g., response sets) constitute real difficulty Mischel (1969) believes, on the basis of both theoretical and empirical grounds, that "the observed inconsistency so regularly found in studies of noncognitive personality dimensions often reflects the state of nature and not merely the noise of measurement" (p. 1014).

Arguing for cross-situational consistency, Alker (1972) has asserted that personality variables can explain individuals' behaviors even though those behaviors may vary from one situation to the next. Specifically, Alker indicates that Mischel (1968) has ignored a number of factors attenuating correlation coefficient size (e.g., restriction of range), and has omitted relevant research employing alternative measurement and combination procedures (e.g., multiscale inventories, regression-compounded indices) which tends to demonstrate high cross-situational consistency. As an alternative to current methodology, Alker proposes that the moderator variable approach (e.g., Kogan & Wallach, 1964) may represent a new personality research paradigm. According to Alker, such an approach would provide a more promising method for detecting personality differences which reflect cross-situational generality, and it could be used to examine person X situation interaction effects which might be stronger than either situation or person effects.

In a reply to Alker (1972), Bem (1972) defends the situational-specificity approach noting that most of Alker's observations are based on a simple misreading or misunderstanding of Mischel's (1968, 1969) accounts. According to Bem, Mischel (1968) discusses factors attenuating correlation coefficients and notes the limitations of nearly every trait-based methodology including multiscale personality inventories and regression-compounded indices. While challenging Alker's conceptual arguments for cross-situational consistency, Bem agrees that the moderator variable approach may be a useful strategy for personality research. He indicates that although previous research (e.g., Kogan & Wallach, 1964) has employed personality variables in a moderator role, situational variables may also be con-

ceptualized in a similar manner. Bem notes, however, that the full heuristic potential of the moderator variable approach can only be realized if researchers can begin to predict, on a priori grounds, which moderators are likely to divide subjects into useful equivalent classes.

Although both Alker (1972) and Bem (1972) agree that the moderator variable approach represents a promising research methodology, Wallach, an early proponent of moderator variables, indicates (Wallach & Leggett, 1972) that the usefulness of this strategy may be more apparent than real. For example, this method, which employs selected subsamples, does not provide correlation coefficients which are consistently higher than those obtained with total samples. Also, the approach is statistically and methodologically complex (Zedeck, 1971) and there is often difficulty in interpreting results of research employing moderator variables. Alternatively, Wallach and Leggett (1972) suggest that consistency might be more appropriately investigated by focusing on behaviors and on the effects of behaviors, which are of interest in their own right, and not on test responses which are of interest only if they function as signs of some hypothetical trait. Results of their research, examining stylistic consistency in size of childrens' drawings, are interpreted as demonstrating cross-situational consistency and supporting an approach which focuses on direct behavioral measurement.

Interactionism. In a paper summarizing and analyzing some of the issues of the personologism versus situationism controversy, Endler (1973) indicates that the question of whether individual differences or situations are a major source of behavioral variance is an important recurrent issue. However, the manner in which the question has been raised makes it a pseudo

issue. "Asking whether behavioral variance is due to either situations or persons, or how much variance is contributed by persons and how much by situations (an additive approach) is analogous to asking whether air or blood is more essential to life or asking one to define the area of a rectangle in terms of length or width. The more sensible question is 'How do individual differences and situations interact in evoking behavior?' "

(Endler, 1973, p. 289). Concerning the present controversy, Endler states that the low correlations of personality traits neither proves nor disproves the existence of consistency, and in like manner, differences across situations do not conclusively prove the primacy of situational effects. Endler concludes that the question, in the past, has not been properly phrased as it is "obvious to everyone that both situational and personal factors are important determinants of behavior, yet the question has been frequently phrased as an either-or proposition" (1973, p. 300).

In summary, Endler (1973) suggests that a new paradigm (Kuhn, 1962) is necessary so that researchers may examine the interaction of personal and situational factors within the same experimental design. One method is to assess the relative variance contributed by persons, situations, and person X situation interactions to behavior through the computation of variance components. In research employing self-report measures, this methodology has indicated the importance of such interactions with respect to the variables of hostility and anxiety (e.g., Endler & Hunt, 1968, 1969). Endler (1973, 1975) suggests that the next step should involve behavioral as well as self-report measures and experimental evaluations of the joint effects of persons and situations on behavior.

Consistent with Endler's views, Bowers (1973) argues that both the