A FACTOR ANALYTIC REPLICATION AND COMPARISON ON THE DIMENSIONALITY OF THE I-E SCALE

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Abstract

The focus of this research was to determine whether the I-E Scale does measure multiple dimensions or is unidimensional as Rotter (1966) had intended.

Introduction

This research presented here is an attempt to replicate and compare the results with Mirels' (1970) earlier study, "Dimensions of Internal Versus External Control." The Mirel study was conducted to clarify the factor structure of the I-E scale. The author suggested that, if subsets of items were found to factor meaningfully, they might be employed as subscales to enhance the prediction of various attitudinal and behavioral variables. In fact, Mirels found two distinct dimensions of the I-E Scale measuring individual locus of control and sociopolitical control. The focus of this research was to determine whether the I-E Scale does measure multiple dimensions or is unidimensional as Rotter (1966) had intended. If it is multidimensional, then these findings may negate many of the previous studies on consumer behavior that have utilized this instrument.

Background

The effects of reward or reinforcement on preceding behavior depend in part on whether the person perceives the reward as contingent on his own behavior or independent of it (Andrisani and Nestel, 1976). This perception of circumstances is referred to as locus of control. Within the framework of social learning theory on which it is based, the purpose of the Internal-External Scale is to measure whether an individual sees this locus of control of reinforcement in his life as being internal or external. One who is oriented toward the external end of the continuum sees little or no value in initiative, since in the extreme case, success and failure are viewed as completely unrelated to ability and effort (Andrisani and Nestel, 1976). At the opposite end of the continuum lies the internal individual who perceives that positive or negative events are a consequence of, or contingent upon, his own behavior and thereby under his personal control. Expressed in the simplest terms, the stronger the perceived relationship between initiative and success, the more worthwhile initiative becomes and the more likely it is to be demonstrated. (Lefcourt, 1966).

The first attempt to measure the internal-external control dimension as a personality variable in social learning theory was reported in a doctoral dissertation by Phares in 1955 (Rotter, 1966). Phares designed a 13-item scale to measure a general attitude or personality characteristic attributing the occurance of reinforcements to chance rather than oneself. The concept went through a series of modifications until 1966 when Rotter introduced the Internal-External (I-E) Scale in the monograph, "Generalized Expectancies for Internal Versus External Control of Reinforcement." (Rotter, 1966). The final scale was a 29-item forced-choice type measure, including six filter items to facilitate disquise, offering alternatives between internal-and external-control interpretations of various events. The individual items are purported to deal with a respondent's beliefs about the nature of the world, with his score being the total number of external choices.

In testing the final scale, it was found that the item analysis and factor analysis showed a reasonably high internal consistency for an additive scale (Rotter, 1966). As the I-E scale was being developed, subscale intercorrelations were performed on the scale but it was found that the subscales tended to correlate highly with one another and further attempts to measure specific subareas were abandoned.

Some cautions must be clearly understood before using the scale. It is clear that subjects can vary in degree from highly external to highly internal and they need not be confined to one extreme of the continuum or the other. It is also understood that scores on the test can be affected by the individual testing conditions, thus reducing comparability, and that subjects being tested can have an effect on the range of scores obtained (Berzins, Ross and Cohen, 1970). Rotter (1966) found a rather narrow range of internal-external control attitudes in college student populations. Also, Ryckman and Malkikisoi (1974) contend that a college student classified as external in relation to other college students may actually be much less so than the average member of the population at large. Deysach, Hiers and Ross (1976) found in two studies of prospective female camp counselors indications that the I-E Scale could be easily faked in an actual employment situation if subjects were given some knowledge of the job's responsibilities or explicit instructions to alter their responses.

The I-E scale has been administered to college students, drug addicts, hospital patients, prospective employees, kindergarteners and prison inmates (Kimmons and Greenhaus, 1976). In many of these cases, the scale was altered somewhat from the original form to better fit the subjects or the circumstances. In the case of this research, all of the actual items of the scale were included and all but one of the filler items were eliminated.

Further work has been done on improving the I-E scale, especially in the area of development of subscales within the scale itself. For instance, Kaemmerer and Schwebel (1976) investigated reports that the Rotter I-E Scale measured many dimensions rather than a unidimensional trait. They separated the internal and external scale items and administered them to a similar student population in a Likert format. The resulting data was analyzed through factor analysis using varimax rotation and yielded five factors: (1) belief in a nonrational world; (2) belief in a politically unresponsive world; (3) belief in a predictable world; (4) belief in a just world; and (5) belief in the meaninglessness of personal effort. The authors suggest that each of these five factors provided a different explanation for why people fail. Andrisani and Nestel (1976) suggested that locus of control, rather than being a stable personality variable, may vary, moving upward along the continuum toward internality with success,

and downward with failure. Mirels (1970) again questioning the unidimensionality or Rotter's I-E scale, explored the tenability of this assumption by factor analyzing the 23 I-E scale, explored the tenability of this assumption by factor analyzing the 23 I-E item responses of a northern, college student population. Two factors were identified: One concerning the mastery over one's own life and the other the individual's impact on political institutions. It was this study that was chosen for replication, because it addresses the basic foundation of I-E scale, itself.

Methodology

A survey instrument containing the 23 item I-E Scale was administered to 186 respondents at a large southern university.

The analysis used in the Mirels' study was duplicated. That is, the responses to the 23 scored items were intercorrelated and the resulting matrix factored by the principal components method with a minimum eignevalue of .8 for computation of components. Squared multiple correlations were entered into the diagonal and the components rotated to orthogonal simple structure by means of Kaiser's Varimax method. The minimum eigenvalue for factor rotation was 1.0.

Two departures were made from the original methodology. Since the factor loadings for male and females were quite similar in the original study, they were not analyzed separately in the replication. Second, since this was a replication, and priori criterion for the number of factors to be extracted was set. By specifying N FACTOR = 2 (Nie, et. al., 1975), the factor analysis was stopped after two factors had been extracted - the same number as was present in Mirels' study. This can be justified in instances where the analyst is attempting to replicate another researcher's work and extract exactly the same number of factors that was previously found (Hair, et.al., 1979).

Results and Discussion

For reference, a rotated factor analysis was run on the responses without specification of the number of factors to be extracted. This resulted in a twelve factor structure with the majority of large loadings grouped on the first few factors in the unrotated matrix and at least one large loading on every factor in the rotated matrix. Large loadings referred to here and throughout the remainder of the paper will be any item loading $\pm$ .30 or greater. This remains consistent with Mirels' study. Factor analyses were also run for the values immediately above and below this point, thirteen and eleven factors, respectively, yielding similar results. However, the eigenvalues in all three of these analyses dropped below 1.0 after the second factor was extracted.

In the analysis where the two predetermined factors were extracted in order to replicate Mirels' study, FACTOR I accounted for 17.2% of the variance and FACTOR II for 7.8%. In comparison, Mirels' study showed the variances for males and females to have been 10.9% & 8.6% and 12.1% & 6.7%, respectively. These figures indicate that some difference is present in FACTOR I, while being at approximately the same level for FACTOR II.

Table I presents the factor loadings of Mirels' research and those loadings obtained from the analysis of the southern college students sample. Under FACTOR I, with the exception of two cases, the items on which males (M) and females (F) both loaded heavily, the combined southern sample (CS) loaded heavily as well. In both cases where CS was not as heavy, it was within a few hundredth's of a point of being so. Differences were found in three items where the CS sample loaded heavily but the other two groups did not. In these three cases, there was a rather large difference in the loadings. This may indicate some difference in feelings on the statements that contrast ability versus luck and chance. When none of the three groups had a heavy loading for a statement, the loadings they did have tended to be within the same general range, indicating agreement. On the items where only one of the sexes loaded heavily with the CS group, interpretation can only be minimal because the sexes were not separated for the CS sample; however, it can be pointed out that there is only one instance where males and the combined sample loaded without females and that is for a statement concerning respect. In three cases where F and CS loaded significantly without M, the loading for M was within a few points. We may take these results as an indication that their locus of control does not vary too greatly on these three statements.

Under FACTOR II we see much more agreement between the two samples. When the two groups in the previous sample had significant loadings, the CS group did as well. On the items where the M and F loadings were not significant, the CS loadings also were not. There were only two exceptions for items on which the M and F loadings were either midrange or quite close to being significant and one which the CS sample was .3 or greater. Thus, the structure of FACTOR II remains quite stabile between the two groups of students.

As in the original Mirels' study, those items loading significantly on FACTOR I concern the control individuals feel they exert over their own destiny. One set of statements attribute the outcome of a life situation to luck or chance, while the other set explains it in terms of hard work and ability. Both types of statements focus on the individual. Whereas in FACTOR II, those items with heavy loadings are concerned with the individual's ability to have some sort of voice in political and world affairs. These statements focus on the social system, and as Mirels pointed out, none are stated in the first person. Mirels suggested that there exists a strong possibility that the answers to these questions are heavily contingent upon the respondent's own opinions of prevailing social institutions. If this is true, then this research suggests that there is, very little difference between the opinions of today's southern college students and those held by the student group Mirels tested nearly ten years ago.

TABLE 1

Rotated Factor Loadings of I-E Scale Items for Males, Females and a Combined Southern Sample

		FACTOR I			FACTOR II		
	ITEM	MALE	FEMALE	COMBINED SOUTHERN	MALE	FEMALE	COMBINED SOUTHERN
2.	People's misfortunes result from the mistakes they make.	-.09	-.20	.41 a	.02	.09	.02 b
3.	Oen of the major reasons why we have wars is because people don't take enough interest in politics.	-.11	.04	.09 b	.11	.28	.33 a
4.	In the long run people get the respect they deserve in this world.	.35	.04	-.33 c	.04	.02	-.01 b
5.	The idea that teachers are unfair to students is nonsense.	.38	.37	-.31 d	.17	.05	.11 b
6.	Capable people who fail to become leaders have not taken advantage of their opportunities.	-.27	-.41	.32 e	-.09	-.23	-.030b
7.	People who can't get others to like them don't understand how to get along with others.	-.17	-.13	.36 a	.08	-.25	.04 b
9.	Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.	-.28	-.30	.40 e	-.09	-.14	-.17 b
10.	In the case of the well prepared student there is rarely if ever such a thing as an unfair test.	.33	.36	.26 f	.22	.07	.11 b
11.	Becoming a success is a matter of hard work, luck has little or nothing to do with it.	.57	.60	-.43 d	.16	.13	.05 b
12.	The average citizen can have an influence in government decisions.	.12	.01	.04 b	.68	.49	.51 d
13.	When I make plans, I am almost certain that I can make them work.	.28	.37	-.41 e	.29	.23	.31 a
15.	In my case getting what I want has little or nothing to do with luck.	.60	.47	-.45 d	.13	.18	.12 b
16.	Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.	-.40	-.59	.28 f	-.19	.03	.01 b
17.	By taking an active part in political and social affairs the people can control world events.	-.04	-.23	.19 b	-.70	-.45	-.66 d
18.	There really is no such thing as "luck."	-.48	-.43	.48 d	-.27	-.10	-.10 b
20.	How many friends you have depends upon how nice a person you are.	-.18	-.29	.12 b	-.02	-.11	-.06 b
21.	Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.	-.03	-.03	.4 b	-.21	-.01	-.01 b
22.	With enough effort we can wipe out political corruption.	.10	.07	-.15 b	.64	.60	.53 d
23.	There is a direct connection between how hard I study and the grades I get.	-.40	-.53	.31 d	-.10	.04	-.14 b
25.	It is impossible for me to believe that chance or luck plays an important role in my life.	-.61	-.58	.50 d	-.10	-.03	-.22 b
26.	People are lonely because they don't try to be friendly.	.11	-.04	-.31 a	.08	.47	.07 b
28.	What happens to me is my own doing.	.37	.42	.37 d	.03	-.11	.24 b
29.	In the long run the people are responsible for bad government on a national as well as on a local level.	-.18	-.01	. 27 b	-.44	-.36	-.44 d

Note: Each item is represented by the alternative scored for internal control. Omitted items 1, 8, 14, 19, 24 and 27 are fillers.

[a] Significant for Combined Southern only.
[b] Not significant for any.
[c] Significant for Males and Combined Southern only.
[d] Significant for all three.
[e] Significant for Females and Combined Southern only.
[f] Significant for Males and Females only.

Summary and Conclusion

The objective of this study was to attempt a replication of an earlier study by Mirels and investigate the effects of using a southern rather than northern student population for study. Rotated factor matrices were developed for the new data with the number of factors set at two, and the resulting data was compared to that obtained by Mirels in his earlier study. It was found that the new data had a better fit with the loadings of Mirels' groups on FACTOR II than in FACTOR I, and within that factor (II) there were only two divergences from the previously significant and non-significant groupings. Since these loadings are not far apart, we may conclude that there was little difference in the populations on the factor concerning political and world affairs. For FACTOR I, the loadings were less clean and indicate that it might possibly be separated into two or more factors. Additionally, there were two statements, numbers 20 and 21, which did not load heavily on either of the two factors. This too, may indicate that the I-E scale might be broken down into more factors.

In conclusion, it appears that the construct of internal-external locus of control is not unidimensional as thought by Rotter. The research presented here and that of Mirels strongly suggest the presence of an individual's luck v. ability (I-E) dimension and one measuring sociopolitical control. Thus a researcher using the I-E Scale in consumer behavior studies should be cautioned against its generalized application, or use only those items that are indicative of the true I-E continuum. Without practicing such cautions, we may be deceiving ourselves by false findings.

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