

The Validity of a Scale to Measure Global Innovativeness

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Abstract

Hurt, Joseph, and Cook (1977) developed a 20 item, self-report scale to measure global innovativeness. The present study used data from a sample of 231 randomly selected adults to describe the scale's dimensionality, reliability, convergent, nomological, and criterion-related validity. While the scale possessed considerable reliability and validity, the innovativeness construct may be multidimensional; both willingness to try new things and creativity appear to contribute to global innovativeness. A shortened, modified version of the scale reflecting these two dimensions is suggested.

Introduction

For years diffusion researchers have investigated problems in the diffusion of innovations paradigm. Difficulties in obtaining wide agreement on what constitutes an "innovation," which variables most influence successful diffusion, and the characteristics of innovators, for instance, remain hotly contested issues in the study of innovation diffusion (Onkvisit and Shaw, 1989). Another unsolved problem is that of measuring innovativeness and thus identifying the innovators in a social system (Midgley and Dowling, 1978). While various methods are commonly used to designate some persons as "innovators" and others as "adopters" there is little agreement as to the validity of these measures. The purpose of the present study is to test the validity of a self-report measure developed by Hurt, Joseph, and Cook (1977) to measure global innovativeness as a stable personality trait.

Two principal methods of measuring innovativeness are proposed in the literature and commonly used by researchers. The most common is a "time-of-adoption" measure derived from Rogers's (1983, p. 22) widely used definition equating innovativeness with the relative time of adoption of an innovation. An innovativeness score is assigned by noting when an individual actually adopts an innovation after its introduction into the social system. The degree of an individual's innovativeness thus becomes a direct function of the relative earliness of his adoption. This approach has been attacked as essentially a temporal concept of innovativeness that yields only an operational definition lacking both content and construct validity (Midgley and Dowling, 1978) and for numerous practical deficiencies (Hurt et

al., 1977) that are discussed below.

Midgley and Dowling (1978) propose an alternative to the time-of-adoption measure they call the "cross-sectional" approach. While the time-of-adoption method is used for only a single innovation at a time, the cross-sectional approach defines an individual's degree of innovativeness as the number of innovations adopted from a list of such items spread across several domains (Midgley and Dowling, 1978). While avoiding some of the shortcomings of the temporal approach, the cross-sectional measure also lacks construct validity because it does not bear an isomorphic relationship with the construct it purports to measure: a normally distributed, stable personality trait that Midgley and Dowling term "innate innovativeness." That is, the number of new items adopted in and of itself may be the function of a variety of other factors operating independently of a construct identified as "innovativeness." Moreover, neither the time-of-adoption nor the cross-sections operationalizations of innovativeness incorporates the motivational forces underlying this behavior. Both methods simply describe specific behaviors and thus serve more clearly as dependent or criterion variables than as indicators of a global innovativeness construct.

In contrast, Hurt et al. (1977) argue that innovativeness is a general personality trait that they describe as "willingness-to-change." As a consequence, instead of attempting to measure the relative time that members of a social system choose to adopt an innovation or the number of innovations they claim to adopt, they have developed a self-report scale reflecting the construct/

trait, "willingness to innovate, not actual adoptive behavior" (Hurt et al., 1977, p. 62). This technique has several advantages over Rogers's "time of adoption" approach:

First, innovativeness can be measured more systematically by the use of self-report techniques. Secondly, it permits a measure of innovativeness which is not innovation specific. Thus the interactive effects of innovator and innovation on the adoption process can be more fully explored. Third, and most importantly, it permits the use of self-report techniques which enable researchers to predict innovativeness. Traditional techniques have primarily employed post-facto interviews to measure innovativeness (Hurt et al., 1977, p.59).

Thus using a self-report, Likert-type scale avoids the problems associated with both the time-of-adoption and cross-sectional measures and has the added advantages of being simple and easy to administer, is not limited to any specific innovation-contexts, and can be evaluated for reliability and validity in accepted ways that the other measures cannot.

To develop their Innovativeness Scale (IS), Hurt et al. used an initial pool of 53 items to describe the characteristics of innovators, later adopters, and non-adopters discussed by Rogers (1983). Item reduction by means of factor analysis using data from samples of 231 students and 431 public school teachers led them to create a 20 item scale containing 12 positively worded and 8 negatively worded statements. One positive item, for instance, reads: "I enjoy trying out new ideas." A negative item reads: "I am suspicious of new inventions and new ways of thinking." A 7-point, Likert-type response format was used, so that the summed scores (after appropriate item reversals) have a theoretical range of 20 to 140, with higher scores indicating greater innovativeness. The sample used by Hurt et al. to develop the scale had a range of 22 to 139, a mean of 102, and a standard deviation of 14. They reported that IS scores in their sample were normally distributed as the theory of innovativeness argues (Midgley and Dowling, 1978). A principal components analyses indicated a two-factor structure for the scale, with the positive items loading on one factor and the negative items loading on the other. They computed a coefficient alpha of .94 for the 20 item scale, and .89 for a ten item short-form. Scores on the IS were only weakly correlated with the Crowne and Marlowe Social Desirability Scale ($r = .115$, $p < .05$).

Hurt et al. (1977) also reported some evidence for the construct and predictive validity of the IS scale. Scores on the IS were positively associated ($r = .50$) with a

measure of opinion leadership and negatively associated ($r = -.45$) with a measure of communication apprehension, as hypothesized. Finally, the mean IS score of a group of students who adopted (voluntarily enrolled) in an educational innovation (changes in industrial arts curricula) was higher than those students who did not. Other researchers have used the IS as a measure of innovativeness in substantive studies with promising results (e.g., Richmond, McCroskey, and Davis, 1982), but they report little evidence for the validity of the scale.

Purpose of the Study

The published studies provide positive evidence for the reliability of the Innovativeness Scale and enough evidence to warrant further study of its validity. Most studies using the IS, however, used student subjects and featured only limited uses of the scale. While these studies may reveal a great deal about the role of innovativeness in social behavior, with the exception of Goldsmith (1986), none specifically addressed issues of validity. If we are to have faith in these results and encourage use of the scale the validity of the Innovativeness Scale needs to be systemically evaluated. Hence, this study describes several psychometric properties of Hurt et al.'s Innovativeness Scale using data from a random sample of 231 adult subjects.

More specifically, the Innovativeness Scale is evaluated first for its reliability and dimensionality. Internal consistency reliability is assessed by computing coefficient alpha. Previous studies cited above suggest a high level of scale reliability that should be reproduced. Scale dimensionality is evaluated by factor analysis. If the IS behaves as described by Hurt et al. (1977) we should find a two factor solution reflecting the positive or negative direction of item wording.

The scale is tested for convergent validity by correlating scores on the IS with scores on three other scales that purport to measure innovativeness (Goldsmith, 1986). Because the developers of these other scales do not define the innovativeness construct in the same way as Hurt et al. (1977) these other scales measure different, but closely related constructs. Hence, large positive correlations are anticipated.

Nomological validity is evaluated by testing correlations of the IS with measures of four personality traits hypothesized to be associated with innovativeness. Previous research on innovativeness suggests that the trait ought to be positively correlated with sensation seeking (Hirschman, 1980; Raju, 1980), risk taking (Raju, 1980) and self-esteem (Midgley and Dowling,

1978), but negatively correlated with dogmatism (Jacoby, 1971).

Criterion-related (concurrent) validity is evaluated by the correlation of the IS with measures of two domain-specific innovative behaviors, self-reported knowledge or awareness of new food products and purchase of these same items. A measure of global innovativeness should not account for a large portion of the variance in a specific behavioral domain (Buss, 1989), such as food purchasing, but it should be positively associated with such innovative behavior to some extent.

Method

Design

The data came from a self-report questionnaire completed by 270 adult American grocery shoppers. This survey studied relationships between personality traits and the purchase of new food products. Because a large number of traits were studied, three versions of the questionnaire were used to minimize questionnaire length. Each version contained the same list of new products, demographic questions, and the four personality scales measuring innovativeness. About one-third of the other personality scales appeared on each of the three versions; therefore, all respondents did not complete all scales. Questionnaire version did not affect response rate.

Subjects

A random sample of adults was chosen in a small southeastern city. Three hundred eighty households were selected using a systematic area sampling procedure (probability proportionate to size) from half the city census tracts balanced for median house value. Blocks and houses on the blocks were chosen at random and visited by student interviewers who identified the primary grocery shopper using screening questions. They elicited the cooperation of the grocery shopper and left a questionnaire to be picked up later in person. One additional attempt was made to reach not-at-homes. Persistent not-at-homes and refusals were replaced at random in the same fashion as the original respondents were chosen. Two hundred seventy usable questionnaires were finally collected by the interviewers for a response rate of 71%.

No attempt was made to assess non-response bias, but the sample proved fairly representative of area grocery shoppers and area census values, slightly underrepresenting blacks and families with children. Since the

focus of the present study was upon the Hurt et al. (1977) Innovativeness Scale, the complete responses from survey participants on this scale served as the criterion for inclusion in the data analysis. The following analyses used data from 231 of the 270 survey participants who responded to all 20 of the IS items. Seventy-three percent of these respondents were female. Whites made up fifty-eight percent and blacks nineteen percent, with one percent "other" and twenty-two percent "missing." White-collar workers predominated with 47%, while blue-collar, retired, unemployed or homemaker, and student classifications accounted for 4%, 10%, 16%, and 12% respectively. Thirty-eight percent had at least one child under age 18 living at home. Reported ages of the 231 respondents ranged from 19 to 77 years, with a mean age of 40.7 (SD = 16.1) and a median age of 35.

Measures

The pencil-and-paper personality scales were used in the formats described by their developers. These scales were used because they have been widely used in other studies with demonstrated reliability and validity. Evidence for their reliability and validity is provided in the references cited. The internal consistency coefficients (alpha or KR-20) of the scales computed in the present study appear in Table 2. These were all acceptably high and comparable to previously reported values.

To test for convergent validity three other scales purporting to measure "innovativeness" were used and appeared on all versions of the questionnaire. The first was the Open Processing Scale developed by Leavitt and Walton (1975) in the marketing/consumer behavior context to measure a distinctive cognitive style presumed to account for innovative purchasing behavior. High scorers, open processors, are predisposed to be more aware of and to adopt new ideas, things, products, or practices because they handle new information in a distinctive way. These individuals are open to experience and have an ability to reorganize their perceptions and cognitions accordingly; they are sensitive to the new and unfamiliar, tolerant of inconsistent and ambiguous stimuli, and use novel cues, more cues, and unfamiliar cues to draw inferences about the state of the world (Leavitt and Walton, 1975). The Open Processing Scale is a 24-item scale with 12 content reversed items.

The second scale came from Jackson (1976, p. 10), who described an innovator as "a creative and inventive individual, capable of originality of thought; motivated to develop novel solutions to problems; values new ideas; likes to improvise." The 20-item Innovation

Subscale of the Jackson Personality Inventory uses a true/false response format and has half its items negatively worded.

The third innovativeness scale was the Kirton Adaption-Innovation Inventory, (Goldsmith, 1986; Kirton, 1976) a 32-item self-report that distinguishes people along a continuum from extreme adaption to extreme innovation. Kirton's theory of adaption-innovation explains that people differ in their cognitive style of problem solving, decision making, and creativity. Innovators tend to solve problems by changing the circumstances in which the problem is embedded, while adaptors strive to maintain as much of the framework as possible through modification and improvement rather than radical change. Although these three innovativeness scales do not describe the same construct as does the Hurt et al. (1977) Innovativeness Scale, these constructs do share many features in common, and previous research (Goldsmith, 1986) shows that they are positively intercorrelated in student samples.

To test for nomological validity, two scales were used to measure sensation seeking. The first was the 40-item Likert-type Arousal Seeking Tendency Instrument developed by Mehrabian and Russell (1974) to measure a global tendency to seek the new and different. The second was the General Sensation Seeking Scale (Zuckerman, 1978) consisting of 22 forced-choice items appropriate for men and women. High scores on both scales indicate greater sensation seeking. These two measures of this trait were positively correlated ($r = .65$, $p = .001$), exhibiting convergent validity that lends confidence to the overall pattern of findings in the study.

Risk taking was measured by the Risk-taking Subscale of the Jackson Personality Inventory (Jackson, 1976). Like the Jackson Innovation Subscale, this is a balanced 20-item measure using a true/false response format. High scores express greater propensity to take risks. Jackson (1976, pp. 25-30) reports several positive correlations between his Risk Taking scale and his Innovation scale that are replicated in this analysis ($r = .58$, $p = .001$) further enhancing the confidence in the findings.

Global self-esteem, or the feelings one has about one's self-worth, was measured by the 10-item Rosenberg (1965) Self-Esteem Scale. Half of these items are reverse-worded. A 4-point, Likert-type response format was used, and larger scores indicate greater self-esteem. Dogmatism was assessed with the Troidahl and Powell (1965) Short Form Dogmatism Scale, a 20-item scale

based on the Rokeach Dogmatism scale. A 6-point Likert-type response format was used with the resulting high scores indicating greater dogmatism.

To test criterion-related validity, measures were taken of the respondents' awareness and purchase of several new grocery products. Since the adoption/rejection of a single new idea, product, or practice is identical with the temporal measure of innovativeness and is too specific to allow for generalization to other areas (Midgley and Dowling, 1978), this version of the cross-sectional measurement approach was used. Although it limits application of the innovativeness construct to a single area (grocery products), the use of several items simultaneously provides a more reliable measure for the criterion test. This is very realistic because researchers are often interested in the acceptance/rejection of new things in a specific domain.

In the present study several steps were taken to provide realistic criterion measures. Grocery products were selected because they are relatively inexpensive (thereby avoiding an income restraint effect) and are purchased by virtually everybody (providing a wide sample of respondents). Managers of four major grocery stores were interviewed, and a lengthy list of new brands appearing in the stores within 5 to 7 weeks prior to the survey was compiled. From this list, eight inexpensive new food products were selected to meet the following criteria. They had to be available in every major grocery store in town, they had to have been advertised in some way, and they were not so unusual that only unique subgroups of the market would be likely to buy them. Two bogus brand names with their fabricated descriptions were added to the list of 8 genuine brands to form an alphabetic list of 10 new food products. This was done to ensure that the resulting summed scores for awareness and purchase would not be contaminated by spurious responding (Goydon, 1984). Respondents were asked to indicate whether they had both heard about and purchased each of the 10 brands. Only the data from 130 respondents who did not claim awareness of at least one of the two bogus brand names was included in the analysis of criterion-related validity.

The first criterion variable was new brand awareness, computed by summing the number of genuine brands respondents indicated that they were aware of prior to the study. The second criterion variable was new brand purchase, computed by summing the number of genuine new brands the respondents claimed they had purchased. These variables ranged from 0 to 8 and from 0 to 6 for awareness and purchase, respectively. The scores on the

two criterion variables were positively correlated ($r = .45$, $p = .001$) as might be expected, indicating the validity of these measures.

Results

Reliability

The scores on the Innovativeness Scale had the following characteristics: range = 51 to 138, mean = 100.14, standard deviation = 16.5, median = 101.6. A Kolmogorov-Smirnov one-sample test of the scale's distribution showed that the null hypothesis of a normal distribution could not be rejected ($p = .206$). Coefficient alpha for the 20-item scale was .89. The IS scores thus had the same psychometric characteristics as described by Hurt et al. (1977).

Scale Dimensionality

To evaluate the scale's dimensionality, the correlation matrix of item scores was factor analyzed. The first analysis was a common factor analysis with squared multiple correlations on the diagonal, followed by a varimax rotation of the factors having eigenvalues larger than one. Five factors were extracted that explained 61.8% of the variance in the matrix. Inspection of the last factor and a scree test (Dillon and Goldstein, 1984, pp. 48-49) suggested that this was only a residual factor composed of cross-loadings of items already loading heavily on earlier factors, and so was not of substantive interest. Thus, a second round of factor analyses was conducted constraining the factor solution to four factors. Because Hurt et al. reported a two factor solution and suggested a high correlation between the two factors, a common factor analysis followed by an oblique rotation was preformed as well as the same analysis followed by a varimax rotation. These two analyses, however, produced virtually the same factor solution, and Table 1 presents the results of the varimax rotation.

This analysis showed a straightforward factor structure for the Innovativeness Scale. The first factor consisted of eight reverse-worded items expressing an unwillingness to try new things. The second factor contained seven items describing a creative, original person. The third factor consisted of only three items, but they very precisely described opinion leadership. The fourth factor contained two items expressing a preference for ambiguities, challenges, and unanswered questions. Only item number 14 ("I am receptive to new ideas") did not load unambiguously on a single factor. Because item 14 loaded heavily on both the first two factors it appears that creative and original individu-

als are willing to try new things. The positive correlation (.52) between these two factors (Table 2) supports this interpretation.

To evaluate the stability of this factor solution, the Innovativeness Scale was administered to 187 American undergraduates, and a common factor analysis with four factors extracted followed by a varimax rotation was performed. This analysis revealed virtually the same factor solution, even replicating the loading of item 14 on the first two factors, except that for this student sample, items 14 and 15 loaded more heavily on the first rather than the second factor. This stability across two samples suggests that the four factor solution is a valid description of the structure of the scale.

Although this factor solution differed from that reported by Hurt et al., the unambiguous interpretation of the scale items suggests that not only does the IS consist of more than one factor, but also the first of these factors taps the domain of innovativeness described by the scale developers as a "willingness to change." The other three factors appear to be related to innovativeness, but are conceptually distinct constructs. Consequently, the remaining results are reported for the total IS scale as well as for four subscales named "Willing To Try," "Creative/Original," "Opinion Leadership," and "Ambiguities." In each case these were constructed (after item reversal for factor one) by summing the item scores in each scale to form four summed subscales. Reliabilities are shown in Table 2 to be acceptable for these short scales. An individual factor analysis of each of these subscales indicated that they were unidimensional. Intercorrelations of the four subscales with each other and with the total IS (shown in Table 2) indicated that they were all positively related to each other, as hypothesized, but the size of these correlations supports the argument that they represent distinct constructs. Finally, the small correlations shown in Table 2 between the four subscales and the total scale with the sex and age of respondents showed that the constructs measured by the scales were not simply a function of these demographic characteristics.

Convergent Validity

Correlations shown in Table 2 between the four subscales and the total Innovativeness Scale with three other measures of innovativeness, the Open Processing Scale, the Jackson Innovation Scale, and the Kirton Adaption-Innovation Scale, were large, positive, and significant for the IS and for the first two factors, Willing to Try and Creative/Original. The correlations of the other two factors, Opinion Leadership and Ambiguities, were smaller, suggesting that they were

TABLE 1
FACTOR ANALYSIS OF THE INNOVATIVENESS SCALE

Item	Factor			
	Willing To Try	Creative Original	Opinion Leader	Ambiguities & Problems
* 1. I am suspicious of new inventions and new ways of thinking.	<i>71</i>	-08	-04	-03
* 2. I am reluctant about adopting new ways of doing things until I see them working for people around me.	<i>70</i>	-30	-11	-11
* 3. I rarely trust new ideas until I can see whether the vast majority of people around me accept them.	<i>65</i>	-04	-03	-15
* 4. I am generally cautious about accepting new ideas.	<i>61</i>	-09	-24	-09
* 5. I must see other people using new innovations before I will consider them.	<i>56</i>	-25	-09	-19
* 6. I often find myself skeptical of new ideas.	<i>56</i>	-16	-07	-01
* 7. I am aware that I am usually one of the last people in my group to accept something new.	<i>53</i>	-26	-21	-06
* 8. I tend to feel that the old way of living and doing things is the best way.	<i>44</i>	-20	-05	02
9. I consider myself to be creative and original in my thinking and behavior.	-24	<i>80</i>	19	08
10. I am an inventive kind of person.	-15	<i>73</i>	17	12
11. I seek out new ways to do things.	-18	<i>65</i>	18	21
12. I enjoy trying out new ideas.	-27	<i>61</i>	14	12
13. I find it stimulating to be original in my thinking and behavior.	-10	<i>59</i>	17	17
14. I am receptive to new ideas.	<i>-41</i>	<i>44</i>	26	07
15. I frequently improvise methods for solving a problem when an answer is not apparent.	-24	<i>42</i>	19	12
16. I feel that I am an influential member of my peer group.	-06	28	<i>69</i>	14
17. My peers often ask me for advice or information.	-14	13	<i>51</i>	07
18. I enjoy taking part in the leadership responsibilities of the groups I belong to.	-13	23	<i>51</i>	16
19. I am challenged by unanswered questions.	-11	29	17	<i>89</i>
20. I am challenged by ambiguities and unsolved problems.	-15	21	22	<i>57</i>
Eigenvalue	6.82	2.14	1.29	1.11
% of variance	34.1	10.7	6.4	5.6

Note. $n = 231$. * Items with reversed scoring. Decimals have been omitted for readability. Salient loadings (those above .40) are indicated by italics to facilitate interpretation.

TABLE 2
CORRELATIONS OF PERSONALITY AND BEHAVIOR MEASURES WITH INNOVATIVENESS

Variable (alpha)	n	Factor					Total
		Willing To Try	Creative Original	Opinion Leader	Ambiguities & Problems		
Sex ^a	223	-.08	-.14*	-.07	-.02	-.12*	
Age	219	-.14*	-.22**	-.18**	-.09	-.21**	
Open Processing (80)	208	.63**	.50**	.30**	.28**	.64**	
Innovation Scale (91)	212	.49**	.68**	.39**	.38**	.67**	
Adaption-Innovation (86)	199	.50**	.48**	.22**	.29**	.55**	
Arousal Seeking (91)	66	.66**	.64**	.16	.37**	.68**	
Sensation Seeking (85)	69	.58**	.47**	.11	.23*	.55**	
Risk Taking (89)	70	.47**	.49**	.43**	.43**	.55**	
Self-Esteem (84)	80	.25*	.43**	.43**	.18	.47**	
Dogmatism (80)	67	-.40**	.14	-.02	.00	-.11	
Awareness	130	.24**	.16*	.04	.00	.19*	
Purchase	130	.05	-.03	-.15	.00	-.02	
Willing to Try (84)	231	--	.52**	.33**	.32**	.84**	
Creative/Original (86)	231	--	--	.49**	.47**	.85**	
Opinion Leader (65)	231	--	--	--	.39**	.63**	
Ambiguities (63) ^b	231	--	--	--	--	.60**	

^a 0 = female, 1 = male

^b Correlation between two items.

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

only related to innovativeness and do not form integral components of the construct itself. This conclusion was supported by the subsequent analyses.

Nomological Validity

The correlations of the total IS with the measures of sensation seeking were large and positive (r 's = .68 and .55) indicating support for the hypothesized relationship between the constructs, but not so large as to suggest that they are identical constructs. The correlations of the four subscales provided positive evidence for the validity of the subscales Willing to Try, Creative/Original, and Ambiguities, but not for Opinion Leadership. This suggests that opinion leadership is not a component of the innovativeness construct, but instead is a conceptually separate trait positively associated with innovativeness. This interpretation of these results is in line with previous research and theory discussed by Gatignon and Robertson (1985).

The positive correlation of the total scale ($r = .55$) with risk taking also supported its validity. The consistent positive correlations for the four subscales indicate that risk taking plays a role in all four dimensions of the IS scale. Self-esteem also seems to be characteristic of innovators, as the positive correlation (.47) between the self-esteem scale and the Innovativeness Scale suggests, but the differential relationships of the four subscales with self-esteem indicates they do not all equally indicate global innovativeness. The difference in size of the correlations between self-esteem with Opinion Leadership (.43) and between self-esteem with Ambiguities (.18) was statistically significant ($p < .05$). This suggests that self-esteem is linked positively with the tendency to act as an opinion leader, but is not as strongly related to an openness to ambiguities and unsolved problems.

The same differential pattern appeared in the case of dogmatism. The overall correlation between dogmatism and the total Innovativeness Scale was too small (-.11) to be significant, but the correlation between dogmatism and the Willing to Try (-.40) factor was large, negative, and significant, as hypothesized. The size difference between the correlation between dogmatism and Willing To Try (-.40), and between dogmatism and Creative/Original (.14), was significant ($p < .05$). Thus, for the personality variables, self-esteem and dogmatism, these correlations support the conclusion that the Innovativeness Scale is composed of four related, but distinct factors, not all of which are indicative of global innovativeness. The tests of criterion-related validity further support this conclusion.

Criterion-Related Validity

The correlation of the total IS with both criterion measures, awareness and purchase of new grocery products (r 's = .19 and -.02), provided only marginal evidence for its criterion validity. The subscale correlations, however, continued to demonstrate the differential pattern of relationships observed in the other validity tests and show that the first subscale, Willing To Try, was positively associated with awareness of new grocery products (r = .24). A second analysis was performed by splitting the sample into two groups, the first 62% or 81 subjects who claimed awareness of at least 5 of the new brands, and the remaining 49 or 38% who claimed awareness of six to eight brands. A t-test of mean differences for the IS and its subscales showed that only one, Willing To Try, was statistically different ($t(128) = 2.85, p = .005$), indicating that the group that was more aware of new grocery brands had a higher mean score on this subscale than the group that was aware of fewer brands. A similar analysis of the purchase of the new brands showed that none of the scale scores were associated with purchase.

Discussion

These results provide evidence for the reliability and validity of the Innovativeness Scale as a measure of global or innate innovativeness, a construct important to understanding the diffusion process (Midgley and Dowling, 1978). This validity study is limited by the American sample on which it is based and to the constructs and measures selected for the validity tests. Although generalizations to other samples and other measures must be made with caution, these positive findings provide a measure of confidence for previous studies using the scale. Replications and extensions using other samples and other relevant constructs are necessary to evaluate more precisely the validity of the Innovativeness Scale and the constructs it purports to measure. In particular, a variety of innovative behaviors in specific domains should be used to evaluate criterion related validity because this area showed the weakest validity evidence for the scale.

The scale was internally consistent and correlated with three other measures of innovativeness, indicating convergent validity and replicating the results reported by Goldsmith (1986). The factor analysis and correlations among the subscale scores, however, show that the Innovativeness Scale is multidimensional. Part of this structure is due to the fact that Hurt et al. included items in their scale that measure opinion leadership rather than innovativeness. Some of their other items, those related to ambiguities and unsolved problems, also bear little

theoretical relationship to the construct the scale is intended to measure. The analysis presented here shows that these items do not contribute to the validity of the scale. Thus there are good theoretical and empirical reasons for removing them. The two dominant factors, however, "Willingness to Try New Things" and "Being Creative and Original," are conceptually relevant to the dimensions of innovativeness as it is viewed by many researchers (Hirschman, 1980).

Significant correlations between these subscale scores and measures of sensation seeking, risk taking, self-esteem, and dogmatism confirm previous research (Gatignon and Robertson, 1985; Goldsmith, 1989) and offer considerable support for the theory that innovativeness is a multidimensional construct. What is proposed here is a two-factor model of innovativeness, consisting of a "willing to try new things" component and a "creativity or originality" component that are themselves positively correlated. In this way the construct of innovativeness is given a more precise definition, and more insight into the antecedents of global innovativeness can be gained. This proposed scale structure also corresponds to the model of innovativeness described by Hirschman (1980) that contains a creativity component and a stimulus seeking construct as motivating forces leading to actualized innovative behavior. Thus, global innovativeness should be conceptualized as a two dimensional construct, and these two factors should be reflected in a short self-report measure of innovativeness containing two subscales.

Because Hurt et al. (1977) confounded direction of item wording with item content by making all of their willing-to-try items negatively worded, further scale development is warranted. This effort should focus on producing positive and negative items measuring both factors of innovativeness. In this way the effects of acquiescence can be muted, and explicit evaluations of agreeing response style can be evaluated. Further research should evaluate the criterion-related validity of the scale. Although some evidence presented here supports this aspect of the scale's validity, this was the weakest part.

Further research should examine the role of global innovativeness as a motivating force in the adoption/rejection of new things using a modified Innovativeness Scale. The relationship between global innovativeness with other constructs should also be explored. These constructs should be measured at the same level of generality as global innovativeness. The two dimensional nature of the scale/trait should be exploited to investigate the relative effects of the two dimensions on innovative behavior. It is reasonable to hypothesize that

these two related subconstructs are linked to different types of innovative behaviors. Some innovators may act largely for the stimulus value new things possess. Other innovators are likely seeking creative and original solutions to problems, making them early adopters of truly new and different innovations. Self-report scales of domain specific innovativeness should be developed so that the time-of-adoption and cross-sectional methods can be relegated to measuring criterion variables and the relative impact of global innovativeness on domain specific innovativeness can be examined.

The author would like to thank Kevin McNeilly for her comments on a draft. Address all correspondence to: Dr. Ronald E. Goldsmith, Marketing Department, College of Business, Florida State University, Tallahassee, FL 32306-1042, (904)-644-7867.

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