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The Development and Validation of the Inquiry Beliefs and Practices Scale

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The Inquiry Beliefs and Practices Scale (IBPS) was designed to measure the philosophical beliefs and scholarly practices of social science researchers. Three philosophies were identified for use in the development of items (i.e., post-positivism, interpretivism, and critical theory). Using a sample selected from the membership of AERA, APA, and ASA, multiple sources of evidence were sought for the construct validity of scores derived from the IBPS. Exploratory factor analysis resulted in the expected patterns of item loadings. Overall, 84% of the items loaded on factors as anticipated and the pattern was seen for both beliefs and practices items. The correlations among the scales also demonstrated expected patterns and the correlations between IBPS scores and time since degree earned were in expected directions. Finally, the results from ANOVA suggest that researchers' responses differed systematically in the anticipated direction, according to both professional organization affiliation and responses to an open-ended description of research activities.

This research involves the development of an instrument to explore the philosophical beliefs and scholarly practices of social science researchers. The assumption was made that variation exists in the philosophical beliefs of researchers and that these beliefs would impact the practices of researchers (i.e.,

questions asked, issues explored, choice of research design, and choice of methods used to collect and reduce data). This is supported by Johnson's statement that what researchers collect as data are based on their presumptions and categories of relevance (Johnson, 1975). Cizek (1995) and Lancy (1993) added that different research designs, specifically qualitative and quantitative approaches, differ at the level of epistemology - how a researcher defines knowledge and how a researcher believes knowledge and/or truth is acquired. This is illustrated by Bernal's (1998) description of how her "Chicana feminist epistemology" gave rise to her research question and by Place and Reitzug's (1992) description of the American Indian philosophy and its impact on their research design. Salomon (1991) supports epistemology as the basis for the difference between qualitative and quantitative research, a basis that transcends that of method. Qualitative and quantitative research are instead based on two different sets of assumptions underlying two different perspectives. In addition, the philosophical perspective adopted determines the phenomena studied, the questions asked, and the method used (Salomon, 1991). Salomon asserts that any of these four considerations: the philosophical perspective, the question asked, the phenomena studied, or the method used, can occur first and determine the choice of the other three.

The intent of this study was to develop an instrument (the Inquiry Beliefs and Practices Scale, IBPS) that would provide insight into both the philosophical beliefs and scholarly practices of social science researchers. It was not intended to focus on the incompatibility / compatibility issue of differing philosophies, but to explore the consistency between adherence to a particular research philosophy and the methods employed by researchers as they actively engage in research. Furthermore, the purpose of this study was not to classify researchers, but rather to

create an instrument capable of measuring the congruence between researchers' beliefs and researchers' practices. It is expected that this type of instrument may prove useful in identifying researchers' and students' preexisting philosophical beliefs and to measure changes in such beliefs which may occur as a result of advanced education or training.

Method

Instrumentation

The first step of instrument development involved the conceptualization of the three research philosophies (Popkewitz, 1984; Johnson, 1975). The notion of subscription to a particular research philosophy, and its congruence with the methods employed, remained the primary focus of this investigation. Soltis (1992) identified three major paradigms currently used in educational research: 1) the positivist or quantitative paradigm, 2) the interpretivist or qualitative paradigm, and 3) the critical theory or neomarxist paradigm. Positivist research is modeled after natural science methodology and strives to obtain objective knowledge that can ultimately be used to establish cause and effect relationships. Interpretivist research is viewed as an interaction between or among the researcher(s) and participant(s) with the goal of understanding the phenomenon from the participants' perspective. Critical Theorist research is founded upon the belief that phenomena must be studied in the context of the historical, social, political, economic and other influences which have given rise to current conditions. The objective is to use knowledge to enhance the quality of life of minorities, women, and other traditionally silenced, ignored, marginalized, and/or repressed groups.

These three paradigms, which will be referred to as “philosophies” in this paper, were used in the construction of behavioral indicators and items. A thorough

examination and exploration of behavioral indicators that constitute adherence to a particular research philosophy was made. It was also necessary to identify aspects of research methods that are commonly employed by those who identify themselves as positivists (or post-positivists), interpretivists, or critical theorists. The identification of behavioral indicators of epistemology, ontology, and methodology for each of the three philosophical perspectives that were later translated into items was made based on the work of Creswell (1998), Guba and Lincoln (1994), Kerlinger (1964), Mertens (1998), and Salomon (1991).

Item Development

Item construction was initiated once the behavioral indicators and philosophical foundations were identified. The aim was to develop two sets of items, the first to measure researchers' beliefs, the second to measure researchers' practices. Once the items were created, modified and revised, a response scale was developed for each set of items. A five-point characterization scale, ranging from 1 = *Not at All* to 5 = *Entirely*, was initially selected for the items designed to capture researcher's beliefs regarding truly superior, rigorous, and exemplary research. A five-point frequency scale, ranging from 1 = *Never* to 5 = *Always*, was selected for the items constructed to obtain information regarding the behaviors incorporated into actual research. The items were then analyzed in terms of their ability to tap the nine specific areas of interest: the epistemological, ontological, and methodological foundations of positivistic/postpositivistic, interpretivistic, and critical theory. The process of item mapping revealed a shortage of items in one cell, the epistemological foundation of critical theory. This was corrected by the development of additional items.

A panel of practicing researchers was asked to review the initial pool of

items to assess their appropriateness, identify any technical item-construction flaws, and check for any appearance of bias. To adequately represent the different research philosophies, the panel consisted of three groups of individuals, one group, self-identified as positivists/post-positivists, a second group, self-identified as interpretivists, and, a third group, self-identified as critical theorists. Seventy-five items were submitted for content review. After the necessary revisions and modifications were made, a new draft of the IBPS was created. Additional experts were consulted and asked for feedback regarding the survey's design and professional appearance.

The original instrument, containing 48 belief items and 27 practices items, was pilot tested on a small sample of professors from the College of Education and the College of Arts and Sciences at a public university in Florida. Results from the pilot test suggested the presence of six sub-scales (i.e. post-positivist, interpretivist, and critical theorist perspectives and methods, respectively), with internal consistency estimates ranging from .80 to .94.

The item-total correlations were examined to assess the relative contribution of each item to its subscale, and an item-total correlation of .45 was used as the minimum for item retention. In addition, the item's contribution to the overall estimated reliability of its subscale was examined. Lastly, items that received negative feedback or comments regarding clarity from the respondents were examined for their perceived contribution to the instrument. Before any items were removed from the instrument, all of the items were mapped into their respective domains (i.e., positivist, interpretivist and critical theorist perspectives). The revised IBPS (Appendix A) was comprised of 55 items, 34 items related to beliefs regarding exemplary research, and 21 items regarding the behaviors incorporated

into actual research. In addition to the beliefs and practices items, respondents were also asked to provide information regarding area of specialization, department, academic rank, year doctoral degree was earned and gender. Lastly, an open-ended item asked participants to describe the type of research they most often conducted.

Sample Selection

A stratified, random sample of approximately 1050 researchers was selected from three national organizations, drawing 350 members from each. The sample was selected based on the diversity of philosophical beliefs and practices represented. From the membership of the American Educational Research Association, 175 members were drawn from Division D (Measurement and Research Methodology). Participants were categorized by geographic region (i.e., North, South, Midwest, and West) and a proportional random sample was selected. In addition, 175 members were chosen from select special interest groups. Respondents were also drawn from the American Psychological Association with approximately 40 participants randomly selected from the membership of each of eight divisions. Lastly, respondents were drawn from the American Sociological Association with an equal number of participants (n = 40) selected from the membership of each of eleven divisions.

The intent in selecting the particular divisions and special interest groups was to secure representation from each of the three philosophical perspectives under investigation. The divisions and special interest groups were chosen based on the assumption that each of these groups would primarily consist of members who adhered to one of the three philosophical perspectives. We acknowledge that membership in a particular division or special interest group does not necessitate

the adherence to a particular philosophical perspective. However, we assumed that sampling from such membership strata would increase the probability of obtaining a variety of perspectives in the sample. Table 1 presents the classification of the sampled divisions and special interest groups according to our expectation of the members' philosophical beliefs. Non-respondent follow-up procedures were employed to encourage participation and improve the response rate.

Sample

The sample of 272 respondents represents an overall response rate of 26% and was 52% male and 48% female. Thirty-six percent of the respondents were Professors, 26% Associate Professors, 16% were Assistant Professors, the remaining 22% held various teaching and research positions. Respondents reported earning their doctoral degrees as early as 1941, and as recently as 1998. Thirteen respondents anticipated completing their degree within the next two years. The median year reported for doctoral degree earned was 1984. Additional information provided regarding department and specialty suggested the representation of a wide variety of disciplines and a diversity of specializations.

Data Analysis

The analyses consisted of non-respondent bias analyses, exploratory factor analyses, correlations between factor score estimates, and known groups analyses. Separate exploratory factor analyses were conducted on the beliefs items and the practices items to provide initial evidence of the construct validity of scores derived from responses. As the items were developed to tap three distinct philosophies, three factors were anticipated for the set of belief items as well as the

Table 1.

Classification of Sampled Divisions and Special Interest Groups.

Positivist	Interpretivist	Critical Theorist
▪ Applied Experimental and Engineering Psychology-APA ▪ Criminology / Delinquency-ASA ▪ Demography-ASA ▪ Experimental Analysis of Behavior-APA ▪ Evaluation, Measurement, and Statistics-APA ▪ Experimental Psychology-APA ▪ Mathematical Sociology-ASA ▪ Measurement and Research Methodology-AERA ▪ Methodology: Quantitative-ASA	▪ Anthropology-ASA ▪ Cultural Sociology-ASA ▪ Ethnomethodology-ASA ▪ Methodology: Qualitative-ASA ▪ Qualitative Research-AERA ▪ Society for the Psychological Study of Social Issues-APA Social Issues	▪ American Indian-Alaskan Native Education-AERA ▪ Critical Examination of Race, Ethnicity, Class, and Gender-AERA ▪ Division of the Psychology of Women-APA ▪ Lesbian and Gay Studies-AERA ▪ Marxist Sociology-ASA ▪ Race/Class/Gender-ASA ▪ Research Focus on Black Education-AERA ▪ Research on Women and Education-AERA ▪ Social Change-ASA ▪ Society for the Psychological Study of Ethnic Minority Issues-APA ▪ Society for the Psychological Study of Lesbian & Gay Issues-APA ▪ Society for the Psychological Study of Men and Masculinity-APA ▪ Work & Labor Markets-ASA

group of practices items. Additionally, the researchers anticipated positive correlations between the interpretivist and critical theorist factors, but negative correlations between each of these factors and the positivist factor.

Further evidence for construct validation of the IBPS was sought by examining the relationships between subscale scores and other variables external to the scores. Profile analyses were conducted for respondents classified by gender, affiliation with the groups identified in Table 1, and the respondents' self-description of current research. Finally, the subscale scores were correlated with respondents' professional age (years since doctoral degree earned). It was anticipated that more recently trained scholars would evidence higher scores on the subscales defined by the interpretivist and critical theorist items, and lower scores on subscales representing a positivist perspective.

Results

Non-respondent Bias Analysis

Careful attention was given to potential differences between those respondents who replied to the initial mailing of the survey and those who returned the survey after a second, follow-up mailing. The χ^2 test of independence and associated effect sizes (Cohen's *w*) were used to compare these two groups on several characteristics. No statistically significant differences were evidenced for the two groups when gender, χ^2 (1, N= 258) = 0.150, p =.698, w =.024, and group membership as defined in Table 1 (i.e., positivist, interpretivist, critical theorist), χ^2 (2, N = 269) = 1.894, p = .388, w =.084. were examined. Similarly, when respondents were classified according to academic rank (i.e., Assistant Professor, Associate Professor, Professor, Non-tenure Earning, Student and Other) no statistically significant differences between the two groups were found, χ^2 (5, N =

238) = 9.243, p = .100, w =.20. Lastly, differences between those who responded to the survey and those who failed to respond were also examined. No statistically significant differences were found for these two groups when division membership, χ^2 (27, N = 1046) = 27.049, p = .461, w =.161, and region, χ^2 (3, N = 174) = 1.564, p = .668, w =.095, were examined.

Factor Analysis

Prior to conducting the factor analyses the distribution of the individual items were examined. The majority of the distributions appeared relatively symmetrical, with skewness and kurtosis values, in all cases, less than 1.5. Separate exploratory factor analyses were run for the 34 beliefs items and the 21 practices items specifying three factors. Squared multiple correlations were used as the initial communality estimates and procrustean (oblique) rotations were employed because of the anticipated correlation between factors. The three-factor solutions accounted for 90% of the variance in the beliefs items and 95% of the variance in the practices items.

The rotated factor pattern matrix for the beliefs items is presented in Table 2. All of the items created for the positivist beliefs subscale (12) loaded on one factor. Ten of the twelve items created for the interpretivist beliefs subscale loaded on a second factor. Absent from this factor were two items that loaded on the third or critical theorist beliefs factor. These items were primarily concerned with the reduction of boundaries between the researcher and participant, and the use of findings to create a better understanding of the participant or group under study. Eight of the ten items created for the critical theorists beliefs subscale loaded on a third factor. The remaining items, concerning the realization that there is no

Table 2.

Rotated Factor Pattern Matrix for Beliefs Items

Item	Factor		
	Positivist	Interpretivist	Critical Theorist
The specification of the research design details prior to beginning the study [1]	0.83	0.01	0.14
The use of instruments that have demonstrated high reliability and validity [1]	0.81	-0.04	-0.02
The use of some randomized process to select / assign participants [1]	0.80	0.04	0.07
The potential for being replicated [1]	0.79	0.02	-0.14
Results that can readily generalize to another sample or population [1]	0.75	-0.08	-0.00
The ability to make predictions based on the findings of the study [1]	0.74	0.07	-0.14
The translation of data into numbers to facilitate the analysis of the data [1]	0.74	-0.17	0.07
The control of extraneous variables [1]	0.72	-0.15	-0.06
Stability over time of the research findings [1]	0.70	0.07	-0.10
The ability to isolate discrete elements of complex phenomenon [1]	0.67	0.11	-0.14
A thorough review of the literature prior to beginning a study [1]	0.66	0.06	0.29
The ability to identify the cause or chain of causal events [1]	0.47	-0.14	-0.16
Recognition that reality exists through interpretations that people make of their world [2]	-0.04	0.77	0.05
Recognition that the research design, variables, participants, and environment are all interdependent [2]	0.29	0.72	0.05
An acknowledgment of the subjective nature of research [2]	0.00	0.64	0.23
Recognition that knowledge is value dependent [2]	-0.04	0.63	0.28
A flexible design which is capable of being responsive to the unexpected [2]	-0.11	0.61	-0.16

Table 2 (Cont'd).

Item	Factor		
	Positivist	Interpretivist	Critical Theorist
Recognition that knowledge is inextricably linked with a particular researcher and the particular group, object, or person under study [2]	0.01	0.60	0.29
Recognition that elements are interdependent and inseparable [2]	0.02	0.57	-0.01
Openness and sensitivity to unanticipated features or events [2]	-0.06	0.55	-0.16
Allowing the context of the study to guide the design of the study [2]	0.03	0.54	0.05
An intuitive, phenomenological analysis of the data gathered [2]	-0.03	0.52	0.19
The realization that there is no morally neutral position when conducting research[2]	-0.13	0.46	0.31
The instruments used for gathering data are the researchers themselves [2]	-0.08	0.37	0.16
The ability to use the findings of the study to assist disenfranchised groups [3]	0.05	-0.07	0.99
An aim toward creating equality between members of society	-0.01	-0.07	0.94
An aim toward ending oppression (historical, gender, class, political, regional) [3]	-0.03	-0.04	0.93
An aim toward creating a more just society [3]	-0.07	-0.08	0.89
The recognition that responsible research is conducted primarily for the benefit of disenfranchised groups [3]	-0.10	0.03	0.81
A focus on problems that detract from the quality of life [3]	0.08	0.00	0.70
A review of past research in order to identify the history of existing power structures impacting the question of interest [3]	0.11	0.23	0.64
A reduction of boundaries between researcher and participant(s) [3]	-0.09	0.25	0.56
A reality seen as shaped by socio-political and economic factors [3]	-0.11	0.33	0.53
Findings that are used primarily to create a better understanding of the participant or group under study [3]	0.12	0.24	0.34

Note: 1 indicates an item written for positivist subscale, 2 indicates an item written for interpretivist subscale, 3 indicates an item written for critical theorist subscale.

morally neutral position when conducting research and the recognition that knowledge is value dependent, loaded on the second factor.

The rotated factor pattern matrix for the practices items is presented in Table 3. All seven of the items designed to represent positivist practices loaded on one factor. In addition to the expected items, however, several items believed to capture interpretivist practices loaded negatively on this factor. Three of these items were concerned with data collection and analysis (i.e., analyzing words and employing the research participants in the data collection and analysis), while the last item was concerned with sampling (i.e., selecting participants purposively, not randomly). Only two of the seven items designed to measure interpretivist practices loaded on a second factor, with three of the expected items loading on the factor defined by positivist items and one item loading on the factor defined by critical theorist items. The third and last item identified the primary purpose for conducting research as increasing the understanding of the group being studied and loaded on none of the factors. All of the seven items created for the critical theorist practices subscale loaded on a third factor. An additional item, concerning the collection of data through interaction with participants, which was created to measure interpretivist practices, also loaded on the critical theorist practices subscale. Overall, 84% of the items loaded on the factors as anticipated, with 88% of the beliefs items, and 76% of the practices items loading on the factors suggested by the proposed item classification scheme.

Table 3.

Rotated Factor Pattern Matrix for Practices Items.

Item	Factor		
	Positivist	Interpretivist	Critical Theorist
I use design procedures and statistics to reduce the influence of extraneous variables. [1]	0.90	0.01	-0.03
I transform most of my data to numbers in order to analyze them statistically. [1]	0.87	-0.02	-0.05
I analyze my data using statistical procedures. [1]	0.86	0.03	-0.03
I specify the details of my research design prior to conducting the study. [1]	0.77	0.18	0.07
I use instruments I know to be valid and reliable to collect data. [1]	0.76	-0.01	0.05
My aim in conducting research is to test a hypothesis. [1]	0.73	-0.09	0.07
I design my study so that it will be replicable. [1]	0.70	0.06	-0.08
Words are most often the data that are analyzed. [2]	-0.62	0.22	0.06
I select my participant(s) purposively, not randomly. [2]	-0.50	0.15	0.10
I collect data primarily through interacting with research participant(s). [2]	-0.35	0.13	0.34
Research participant(s) work with me as partners in analyzing the data. [2]	-0.24	0.11	0.11
As the study progresses, I continually remain alert to the ways in which I may impact the study. [2]	-0.00	0.71	0.02
I maintain alertness to the influences / impact of my values on the study. [2]	-0.04	0.68	0.20
My primary purpose for conducting research is simply to better understand the participant or group I am studying. [2]	-0.16	0.16	-0.08
My purpose in conducting research is to benefit disenfranchised groups. [3]	0.01	-0.08	1.00
My primary purpose in conducting research is to benefit disenfranchised groups. [3]	0.01	-0.09	0.98

Table 3 (Cont'd).

Item	Factor		
	Positivist	Interpretivist	Critical Theorist
I conduct research with an aim toward ending oppression (historical, gender, class, political, regional). [3]	-0.00	0.00	0.92
I conduct research with an aim toward creating a more just society. [3]	0.01	0.04	0.84
When conducting research, I morally position myself with the disenfranchised group. [3]	-0.10	-0.05	0.84
I maintain alertness to the impact of socio-political and economic factors on my research study. [3]	0.03	0.40	0.51
My principal intent in doing research is to benefit the participant(s) being studied. [3]	0.07	0.21	0.48

Note: 1 indicates an item written for positivist subscale, 2 indicates an item written for interpretivist subscale, 3 indicates an item written for critical theorist subscale.

The interfactor correlations for the beliefs and practices factors are shown in Table 4 with beliefs presented below the diagonal and practices presented above the diagonal. These correlations demonstrate that the positivist beliefs factor correlated negatively with both interpretivist beliefs (r = -.26) and critical theorist beliefs (r = -.37), while the latter two factors correlated positively with each other (r = .60). A similar pattern was seen in the correlations between factors underlying the practices scales, with positivist practices being inversely related to both interpretivist practices (r = -.17) and critical theories practices (r = -.42). As with the beliefs subscales, the interpretivist and critical theorist practices scores were positively correlated with each other (r = .43). These correlations are in the expected directions given the differences between positivism and the philosophies of interpretivism and critical theory and the similarities between interpretivism and critical theory.

Table 4.

Interfactor Correlations

	Practices		
Beliefs	Positivist	Interpretivist	Critical Theorist
Positivist	1.00	-.17	-.42
Interpretivist	-0.26	1.00	0.43
Critical Theorist	-0.37	0.60	1.00

Note: Correlations between beliefs factors are below the diagonal and correlations between practices factors are above.

Creation of Subscales

Because the results from the factor analysis supported, in large part, the anticipated structure of the instrument, six composite variables were created based on the proposed classification scheme. These composite variables were used to address the question of congruence between respondents' beliefs and practices. For the six composite variables, the mean ranged from 3.60 for the positivist practices subscale, to 2.83 for the critical theorist beliefs subscale. The mean, standard deviation, skewness and kurtosis for the composite variables are presented in Table 5. The internal consistency of each of the six subscales was estimated using Cronbach's alpha, and ranged from .94 for both the critical theorist beliefs and practices subscales to .72 for the interpretivist practices subscale.

Table 5.

Descriptive Statistics for the Subscales

Subscale	N	Mean	Standard Deviation	Skewness	Kurtosis
Beliefs					
Positivist	272	3.50	0.84	-0.57	-0.07
Interpretivist	272	3.37	0.77	-0.19	-0.66
Critical Theorist	271	2.83	1.09	0.12	-0.97
Practices					
Positivist	266	3.60	1.08	-0.76	-0.39
Interpretivist	266	3.10	0.77	0.03	-0.39
Critical Theorist	265	2.87	1.20	0.25	-1.11

Additional Non-Respondent Bias Analysis

In addition to the non-respondent bias analyses discussed earlier, a series of independent means t-tests were conducted to explore potential differences between the two groups of respondents (first and second mailing), on each of the six subscales. Once again, no statistically significant differences were found (*p* values for these tests ranged from .084 to .925).

Correlations between Subscales

A correlational analysis was conducted to examine the relationship between researchers' beliefs and their practices. The results from this analysis (Table 6) suggest that overall researchers' beliefs are congruent with their practices as demonstrated by the higher correlations appearing between the belief and practice within the same philosophical perspective. Positivist beliefs were correlated with positivist practice ($r = .82$), interpretivist beliefs were correlated with interpretivist

practice (r = .74), and critical theorist beliefs were correlated with critical theorist practice (r = .82). Moderate positive relationships were also seen between the interpretivist beliefs and critical theorist practice (r = .63) and critical theorist beliefs and interpretivist practices (r = .66). Moderate to strong positive relationships were seen between interpretivist and critical theorist beliefs (r = .79) and interpretivist and critical theorist practice (r = .69). Negative relationships were observed between these four indicators and the two positivist indicators. These results also provide further evidence of construct validity.

Table 6.

Correlations Among Subscales

	Beliefs			Practices		
	Positivist	Interpretivist	Critical Theorist	Positivist	Interpretivist	Critical Theorist
Beliefs						
Positivist	0.93					
Interpretivist	-0.41	0.90				
Critical Theorist	-0.49	0.79	0.94			
Practices						
Positivist	0.82	-0.49	-0.53	0.92		
Interpretivist	-0.54	0.74	0.66	-0.59	0.72	
Critical Theorist	-0.44	0.63	0.82	-0.48	0.69	0.94

Note: Cronbach's alphas for each subscale appear on the diagonal.

Relationships with Other Variables

The construct validity of the scores derived from the IBPS was further investigated by examining the relationships between scores on the instrument and other variables. Specifically, correlations between scores and the length of time since the respondent received his/her terminal degree were investigated, and mean differences between the responses of known groups were tested. Three such known-group assessments were conducted: groups based on organizational membership (Table 1), groups based on responses to the open-ended item related to research practices, and groups based on researcher gender.

Correlations with Time Since Degree

The Pearson Product-Moment correlations between time since terminal degree was earned, and responses to each of the six subscales ranged from –0.37 to 0.16. All correlations were in the anticipated direction and all were statistically significant at the .05 level. Both positivist scales were positively correlated, albeit weakly, with time since degree (for the beliefs scale, r = .16; for the practices scale, r = .12), indicating that respondents who received their terminal degrees earlier presented higher means on these scales than researchers who received their degrees later. Conversely, responses to the beliefs and practices scales reflecting interpretivist and critical theory beliefs were negatively correlated with time since degree (for interpretivist beliefs, r = -.20, for interpretivist practices, r = -.19; for critical theorist beliefs r = -.37, and for practices r = -.30). This indicates that the higher means are evidenced by researchers who were more recently awarded their terminal degrees.

Organizational Membership

As stated earlier, respondents were classified into groups expected to evidence a propensity toward post-positivist, interpretivist, or critical theorist beliefs based upon their membership in organizational divisions or interest groups. For example, we anticipated that members of the Qualitative Research SIG of AERA would respond to the instrument (in general) in a manner reflecting interpretivist research beliefs, while members of AERA's Measurement and Research Methodology Division would reflect a post-positivist perspective.

The sample means for the six subscales by group membership are presented in Table 7 and the resulting mean profiles are graphed in Figure 1. The data were analyzed using a mixed model ANOVA with one between-subjects factor (group membership) and one within-subjects factor (subscale). In addition to the statistical significance of the F tests, the effect sizes (Cohen's ***f***, 1988) associated with the sources of variation in the ANOVAs were estimated.

The results of the ANOVA suggest statistically significant main effects and medium to large effect sizes for both group membership ($F(2, 258) = 16.64$, $p < .01$, $\boldsymbol{f} = .34$) and subscale ($F(5, 1290) = 19.78$, $p < .01$, $\boldsymbol{f} = .27$), as well as a significant interaction effect ($F(10, 1290) = 32.17$, $p < .01$, $\boldsymbol{f} = .45$). Because of the statistically significant interaction effect, differences between cell means were tested to guide the interpretation of the results. Holm's modified Bonferroni procedure was used to control the familywise Type I error rate at .05 for the set of pairwise tests. The results of these tests revealed statistically significant differences on all six subscales between mean responses for researchers classified as post-postivists and each of the other two groups of respondents (interpretivists and critical theorists). The tests also revealed significant differences between the

Table 7.

Subscale Responses by Respondent Group Membership in Professional Organization Divisions

		Respondent Group Membership		
Subscale		Positivist	Interpretivist	Critical Theorist
Beliefs				
Positivist	M	3.86	2.88	3.36
	SD	0.65	0.91	0.77
Interpretivist	M	3.13	3.52	3.61
	SD	0.72	0.82	0.73
Critical Theorist	M	2.36	2.93	3.36
	SD	0.89	1.15	1.04
Practices				
Positivist	M	4.07	2.76	3.44
	SD	0.78	1.18	1.06
Interpretivist	M	2.77	3.56	3.29
	SD	0.66	0.81	0.70
Critical Theorist	M	2.32	2.94	3.49
	SD	1.02	1.26	1.06

interpretivists and the critical theorists on the positivist beliefs and positivist practices subscales (with the critical theorists presenting higher mean scores on each scale). Similarly the interpretivists' and critical theorists' means evidenced

statistically significant differences on the critical theorist beliefs and critical theorist practices subscales (with the critical theorists responding with higher means on each scale). However, there were no significant differences between the critical theorists and interpretivists on the interpretivist beliefs or interpretivist practices scales. Thus, the post-positivists responded with significantly higher means on the positivist beliefs and positivist practices scales, and with significantly lower means on the beliefs and practices scales for interpretivist and critical theorist orientations. The critical theorists responded with significantly higher means than the interpretivists on the beliefs and practices scales representing both positivist and critical theorist orientations. However, the interpretivists and critical theorists did not differ from each other on either of the interpretivist scales.

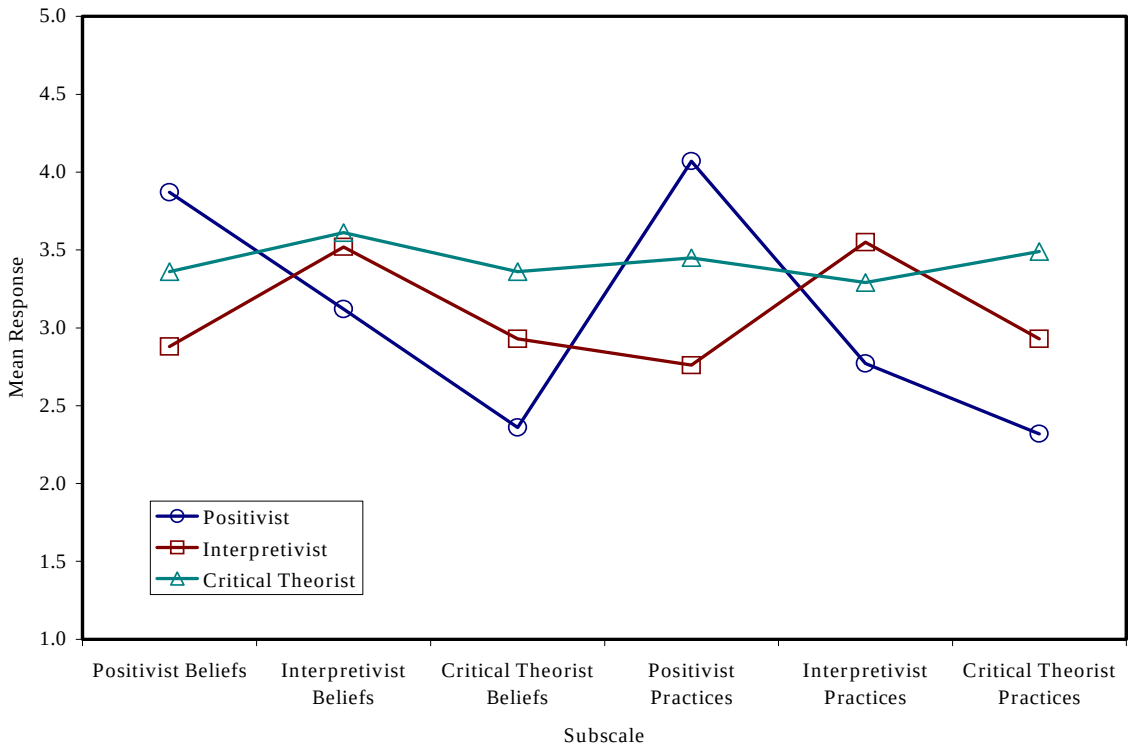

Figure 1. Profile Analysis of Researchers' Mean Scores Classified by Division/SIG Membership

Effect sizes (Cohen's *d*) associated with the pairwise differences between groups on each subscale are presented in Table 8. The contrasts associated with the positivist group ranged in magnitude from 0.52 to 1.44. The contrasts associated with the differences between the interpretivist and critical theorist groups were smaller in magnitude, ranging from 0.12 to 0.62.

Table 8.

Effect Sizes Associated with Pairwise Differences of Organizational Membership Groups.

	Pairwise Difference		
Subscale	Positivist vs. Interpretivist	Positivist vs. Critical Theorist	Interpretivist vs. Critical Theorist
Beliefs			
Positivist	1.34	0.71	0.59
Interpretivist	0.52	0.66	0.12
Critical Theorist	0.59	1.04	0.40
Practices			
Positivist	1.44	0.69	0.62
Interpretivist	1.12	0.77	0.37
Critical Theorist	0.57	1.13	0.49

Open-ended Responses

Respondents were also classified into three groups based upon their responses to the open-ended item asking for a brief non-technical description of

their research. The group means and standard deviations are presented in Table 9 and the means are graphed in Figure 2.

Table 9.

Subscale Responses by Respondent Classifications From Open-Ended Description of Research

		Respondent Group Membership		
Subscale		Postivist	Interpretivist	Critical Theorist
Beliefs				
Positivist	M	3.90	3.03	2.78
	SD	0.52	0.90	0.91
Interpretivist	M	3.19	3.74	3.73
	SD	0.74	0.67	0.76
Critical Theorist	M	2.52	3.19	3.69
	SD	1.00	1.09	0.88
Practices				
Positivist	M	4.16	2.82	2.69
	SD	0.62	1.19	1.07
Interpretivist	M	2.80	3.62	3.66
	SD	0.65	0.65	0.69
Critical Theorist	M	2.53	3.11	3.97
	SD	1.02	1.31	0.96

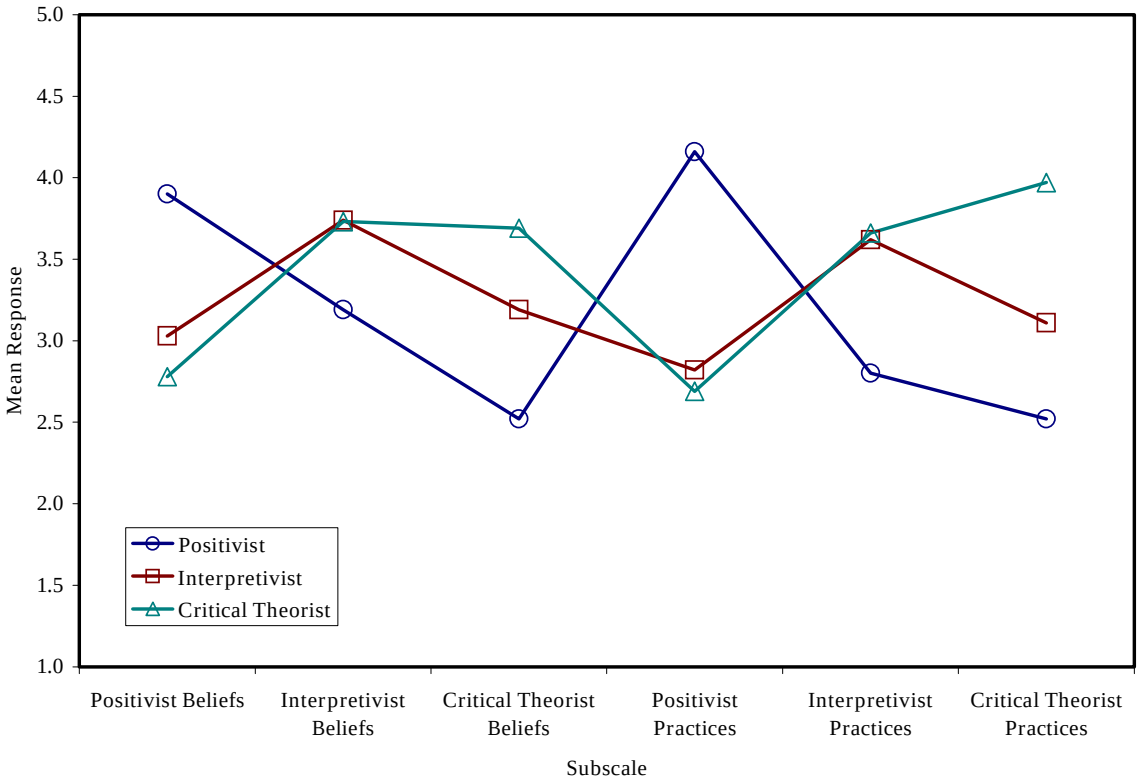

Figure 2. Profile Analysis of Researchers' Mean Scores Classified by Open-Ended Research Item

As with the analysis of differences associated with organizational membership, the results of the ANOVA suggest a statistically significant main effect for the classification of respondents ($F(2, 215) = 3.47$, $p < .05$, $\boldsymbol{f} = .177$) and for subscale ($F(5, 1075) = 6.02$, $p < .01$, $\boldsymbol{f} = .165$), although the effect sizes associated with the main effects were small. However a statistically significant interaction with a large effect size was observed ($F(10, 1075) = 47.45$, $p < .01$, $\boldsymbol{f} = .553$). Pairwise differences on each subscale were tested using Holm's modified Bonferroni procedure. These tests suggest that the participants whose open-ended response was classified as positivist scored statistically significantly higher than either of the other groups on both the positivist beliefs and positivist practices

scales. Further, these participants scored statistically significantly lower than either of the other groups on the beliefs and practices scales that reflect interpretivist and critical theorist orientations. The participants whose open-ended response was classified as critical theorist scored statistically significantly higher than those who response was classified as interpretivist on both the critical theorist beliefs and critical theorist practices scales. However, the critical theorists and interpretivists did not differ from each other on either beliefs or practices scales that represent positivist or interpretivist orientations.

Effect sizes associated with the pairwise differences between groups on each subscale are presented in Table 10. As with the effect sizes associated with organizational differences, the contrasts associated with the positivist group evidenced effect sizes that were very large in magnitude (ranging from 0.52 to 2.00). The contrasts associated with the differences between the interpretivist and critical theorist groups produced more modest effect sizes, ranging from 0.01 to 0.72.

Gender Differences

In addition to the classification of respondents by organizational membership and by responses to the open-ended item, gender differences in responses to the subscales were investigated using an ANOVA. The means and standard deviations by respondent gender are presented in Table 11 and the means are graphed in Figure 3.

Table 10.

Effect Sizes Associated with Pairwise Differences of Open-ended Item Classifications.

	Pairwise Difference		
Subscale	Positivist vs. Interpretivist	Positivist vs. Critical Theorist	Interpretivist vs. Critical Theorist
Beliefs			
Positivist	1.31	1.81	0.28
Interpretivist	0.77	0.73	0.01
Critical Theorist	0.65	1.20	0.49
Practices			
Positivist	1.58	2.00	0.11
Interpretivist	1.26	1.31	0.06
Critical Theorist	0.52	1.43	0.72

The results of the ANOVA suggest statistically significant main effects for both sex ($F(1, 248) = 32.98$, $p < .01$, $\boldsymbol{f} = .117$) and subscale ($F(5, 1240) = 30.84$, $p < .01$, $\boldsymbol{f} = .333$), as well as a significant interaction effect ($F(5, 1240) = 20.45$, $p < .01$, $\boldsymbol{f} = .276$). Because of the statistically significant interaction effect, differences between cell means were tested to guide the interpretation of the results. Holm's modified Bonferroni procedure was used to control the familywise Type I error rate at .05 for the set of pairwise tests. The results of these tests revealed that the mean responses for males and females differed significantly from each other on all

six subscales. Thus, the female respondents evidenced significantly lower means on the positivist beliefs and positivist practices scales, but significantly higher means on the beliefs and practices scales reflecting interpretivist and critical theory orientations.

Table 11.

Subscale Responses by Respondent Gender.

Subscale		Male	Female	*d*
Beliefs				
Positivist	M	3.64	3.32	.390
	SD	0.80	0.85	
Interpretivist	M	3.10	3.69	-0.81
	SD	0.77	0.68	
Critical Theorist	M	2.48	3.22	-0.72
	SD	1.06	0.98	
Practices				
Positivist	M	3.74	3.43	0.29
	SD	1.03	1.14	
Interpretivist	M	2.87	3.37	0.68
	SD	0.71	0.76	
Critical Theorist	M	2.49	3.28	-0.69
	SD	1.14	1.14	

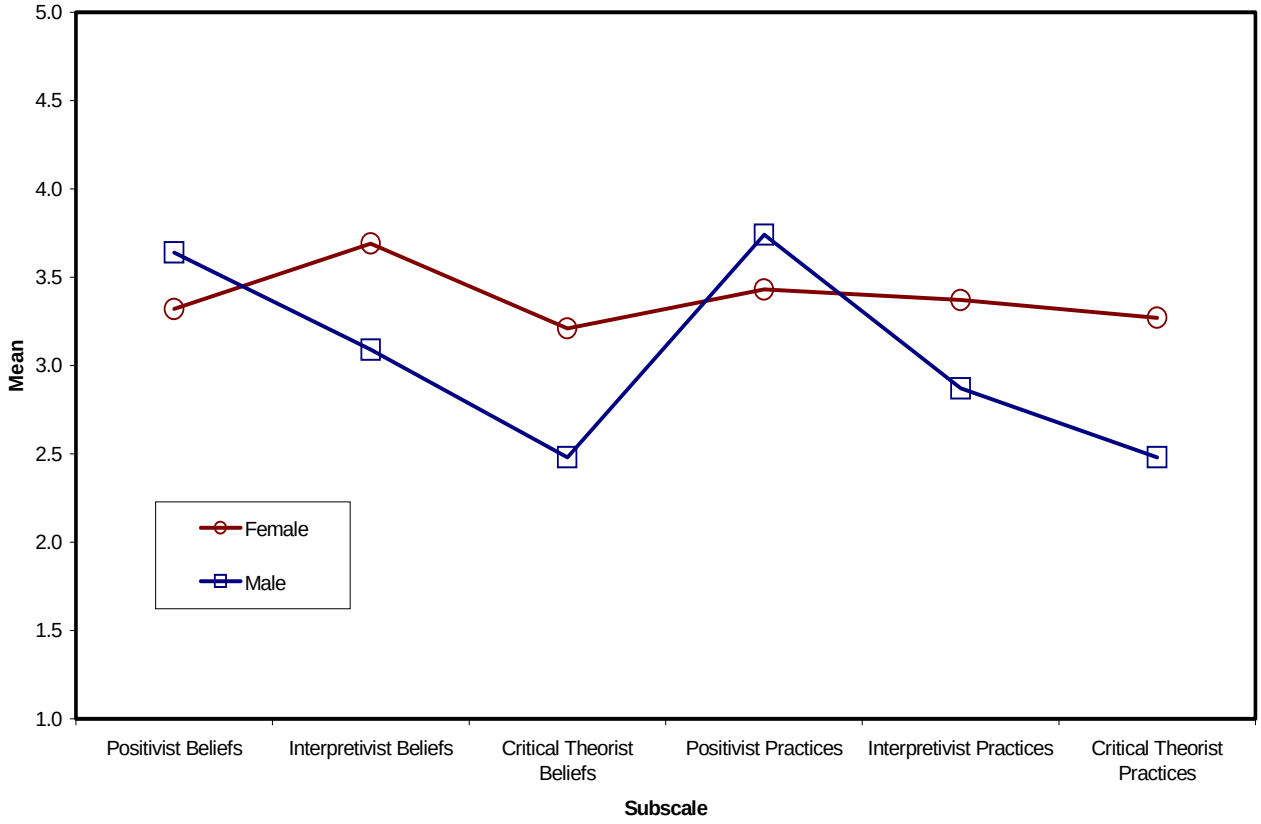

Figure 3. Profile Analysis of Researchers' Mean Scores Classified by Research Gender

The effect sizes associated with sex differences are presented in Table 11. The smallest effect sizes were associated with differences on the positivist scales (effect sizes of 0.29 and 0.39 for the practices and beliefs scales, respectively). Sex differences on critical theorist and interpretivist beliefs and practices were notably larger in magnitude than those associated with the positivist scales (ranging from 0.68 to 0.81).

Because respondent sex was significantly correlated with time since terminal degree was awarded (r = .301, p < .01), we tested for sex differences in responses after statistically controlling for time since degree. These analyses revealed that the

statistically significant sex differences remained (with an identical pattern of mean differences) after controlling for time since terminal degree was awarded.

Discussion

Multiple sources of evidence were sought for the construct validity of scores derived from the IBPS. Exploratory factor analysis resulted in the expected pattern of item loadings. That is, items that were created to measure positivism loaded on a single factor, the items created to measure interpretivism loaded on a second factor, and the items created to measure critical theory loaded on a third factor. Overall, 84% of the items loaded on factors as anticipated and the pattern was seen for both beliefs and practices items (although the pattern was stronger for the beliefs items).

The correlations among the scales also demonstrated expected patterns with beliefs and practices within a philosophy having strong, positive correlations. Correlations between positivist subscales and the other subscales were negative, while correlations between interpretivist and critical theorist subscales were positive. This pattern was consistent across the beliefs and practices subscales. The reliablity estimates using Cronbach alpha ranged between .90 and .94 for five of the six subscales (and .72 for the sixth subscale) indicating an acceptable level of internal consistency.

The correlations between scores derived from the IBPS and time since degree earned were in expected directions. Responses to the critical theorist and interpretivist subscales were negatively correlated with time since degree earned (i.e., those with higher scores on these scales were more recently trained in graduate schools). Conversely, scores on the positivist scales were directly correlated with time since degree earned. These results contribute to the evidence

for validity because of the recent increase in interest and applications of alternative paradigms in social science educational programs. Further, the results from ANOVA suggest that researchers' responses to the beliefs and practices items differ systematically in the anticipated direction, according to professional organization affiliation and according to researchers' responses to an open-ended description of their research activities. Finally, researcher gender was associated with responses to the beliefs and practices items, a relationship that was evident even after controlling for time since degree earned.

The correlation among interpretivist and critical theory subscales was expected; however it may be possible to create items that will distinguish between these two philosophies more clearly. Some authors (e.g., Miles & Huberman, 1994; Bogdan & Biklen, 1992) have asserted that the methods used by interpretivists and critical theorists are mostly identical, although their research goals differ. However, further work in item development may yield areas of method that are reliably distinguishable and that elucidate the differences in these research approaches. Future work should also be directed at exploring the gender differences that were suggested in the data.

In summary, the evidence gathered to date support the validity of scores derived from the IBPS. The instrument should provide a useful measure of researchers' and students' philosophical beliefs. A potential application of the instrument is to measure changes in such philosophical beliefs that may result from advanced education or professional experiences. Additionally, the instrument may be useful to stimulate discussion among professional groups engaged in multi-paradigmatic inquiry. Further, the instrument may be a valuable tool for teaching, as a framework for introducing, exploring, and examining philosophical

foundations of research. Finally, it is also hoped that the instrument itself will have a reactive effect, causing researchers to examine or re-examine their own philosophical perspectives and to question themselves about their epistemology, ontology and methodology.

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