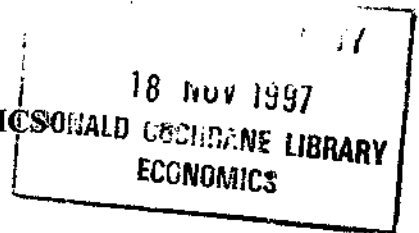


MONASH UNIVERSITY  
FACULTY OF BUSINESS & ECONOMICS



**QUALITATIVE ANALYSIS OF LATENT AND  
MANIFEST VARIABLES IN A STUDY OF  
ENTREPRENEURIAL LOCUS OF CONTROL**

**Judy Gray & Iain Densten**

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**ABSTRACT**

The relative virtues of quantitative and qualitative research have been vigorously debated. Several researchers recommend combining methodologies but there is little evidence in the literature to suggest how different research methods might be integrated (Bryman, 1988). The current study addresses this deficiency in the research by examining the use of latent variables in quantitative and qualitative research as a means of blending the two approaches. A study of entrepreneurial Locus of Control where quantitative and qualitative data were available illustrates the methodological issues. Analysis of quantitative data was conducted using LISREL (7.20) and qualitative data were categorised using NUDIST (Non-numerical Unstructured Data Indexing Searching and Theorising computer software). Detailed comparisons are made between the method described in this paper and other approaches to content analysis.

# QUALITATIVE ANALYSIS OF LATENT AND MANIFEST VARIABLES IN A STUDY OF ENTREPRENEURIAL LOCUS OF CONTROL

## INTRODUCTION

There has been considerable debate concerning philosophical issues and the relative virtues of quantitative and qualitative research. Berg (1995:3) states that quantitative research 'refers to counts and measures of things,' while Tesch (1992:56) defines qualitative research as 'predominantly or exclusively using words as data.' Quantitative research is based on the gathering of facts, stresses the importance of devising valid and reliable measurement procedures, and adopts the principles of scientific method by emphasising the importance of the generalisation and replication of results (Bryman, 1988). However, qualitative research adopts a naturalistic approach which aims to retain fidelity to the real world and stresses the importance of 'social reality in subjects' perceptions of their environment' (Bryman, 1988:70). Thus, the major contrast between the two approaches is evident in the differing views concerning how social reality should be studied.

There is a tendency among some writers to refer to quantitative and qualitative research as divergent paradigms (for example, Filstead, 1979; Guba and Lincoln, 1982) which has led to an exaggeration of the differences between the two traditions. However, a more useful approach which minimises the distinction between quantitative and qualitative research relies on the selection of techniques according to their suitability in tackling particular research questions (Bryman, 1988). Such a view emphasises the strengths of various approaches.

Several researchers have recommended combining methodologies in the study of the same phenomena to achieve triangulation and to improve the study design.(Denzin, 1978; Fielding and Fielding, 1986; Patton, 1990). In this context, quantitative and qualitative research may be viewed as different ways of examining the same research problem. The use of multiple methods strengthens the researcher's claims for the validity of the conclusions drawn where mutual confirmation of results can be demonstrated (Bryman 1988). Further, Patton (1990) suggests that where significant patterns of responses emerge through quantitative methods, it is often helpful to fill out the meaning of those patterns through in-depth study using qualitative methods to give substance to the areas of focus. However, the combinations of research methods refer to using different techniques in tandem, but as Bryman (1988) states, there is little evidence in the literature to suggest how different research methods might be integrated. The current study addresses this deficiency in the research by examining the use of latent variables in quantitative and qualitative research as a means of integrating the two approaches.

## BACKGROUND

Previous qualitative research has focused on examining the manifest content, the elements that are physically present and countable. 'Manifest content is comparable to the surface structure present in a message' (Berg, 1995:176). Thus, a content analysis approach, for example, the 'constant comparison' method suggested by Glaser and Strauss (1967) involves examining the patterns evident in the data and classifying the data into preliminary categories. A similar approach has been used where key words or phrases are extracted from qualitative data to form descriptive units or 'propositions' (Chen and Meindl, 1991:532). These propositional descriptions are grouped into more superordinate theme categories. Several studies have developed the classification of propositions into

custom dictionaries, systems of category definitions to aid data analysis for particular projects (Insch, Moore, and Murphy, 1997; Meindl, Ehrlich, and Dukerich, 1985; Tesch, 1992).

According to Weber (1985:10), 'the best content analytic studies utilise both qualitative and quantitative operations on text' by including the calculation of frequencies and percentage frequencies of comments coded in each category. However, the quasi-statistical approach to content analysis does not necessarily reflect the importance or the nature of the data. Therefore, an alternative approach is required which examines the latent content, the 'deep structural meaning conveyed by messages' (Berg, 1995:176). This approach is consistent with the identification of latent variables in quantitative analysis where a latent variable is a 'hypothesised and unobserved concept that can only be approximated by observable or measured variables' (Hair, Anderson, Tatham, and Black, 1995:623). In quantitative analysis, latent variables are statistically developed from clusters of items, while in qualitative analysis, latent variables are developed from the inferences derived from the messages (Holsti, 1969).

Problems arise from attempts to triangulate manifest with latent variables. Observable data (i.e., manifest variables) can not be directly compared with unobservable constructs (i.e., latent variables). Failure to recognise the differences between the types of constructs may explain why difficulties can be experienced when triangulating data across methods. For example, in a study of business success, quantitative manifest variables (e.g., profits, number of employees, and size of operation) can not be compared directly with the qualitative latent variable of entrepreneurial success. While manifest variables may be very good indicators of the underlying latent variable of entrepreneurial success, direct comparisons are invalid because manifest variables are by definition, observable and can not be compared with variables that are by definition unobservable. Therefore, when integrating qualitative and quantitative data in a study, it is necessary to ensure that comparisons are made at the same level (e.g., that quantitative manifest variables are compared with qualitative manifest data, or quantitative latent constructs are compared with qualitative latent variables). The current study utilises the quantitative latent variables as a conceptual framework to analyse the interview comments, thus unifying the study and allowing comparisons to be made. The approach allows a 'dialog [to] be established between quantitative and qualitative research in such a way that the respective contributions of each approach can enhance our overall understanding of a domain' (Bryman, Stephens, and Campo, 1996:356). Further, using this research approach may support the claim that a rigid distinction between quantitative and qualitative research is unwarranted.

### **The Application of Latent Variable Analyses**

The current study examines both quantitative and qualitative data to illustrate the methodological issues under consideration, and thus, the substantive findings of the study have been omitted in this paper. Only a brief outline of the quantitative analyses is provided to enable comparisons to be made between the quantitative and qualitative findings.

The study focuses on the relationship between Locus of Control and business success for a sample of previously unemployed respondents who became self-employed. The personality variable Locus of Control (Rotter 1966) refers to the 'expectancy that rewards, reinforcements or outcomes in life are controlled either by one's own actions (internality) or by other forces (externality)' (Spector, 1988:335). Entrepreneurs who are internally controlled are likely to believe that they can influence what happens to them through their own abilities, skills, or effort and may take initiatives to affect the outcome of events (Brockhaus, 1982).

## METHOD

A self-administered questionnaire was distributed which included 13 items from the Internal-External Locus of Control scale (Rotter, 1966) resulting in 255 useable responses (45 per cent response rate). Spector (1988) suggests that items in the Locus of Control construct should be domain specific, and therefore, items used in the current study were those without high loadings on the political control subscales identified in previous research (Gurin, Gurin, and Morrison, 1978; Levenson, 1981). In-depth, semi-structured interviews were conducted with approximately ten per cent of respondents (25 in all).

### Quantitative Analysis

Exploratory factor analysis was undertaken to reduce the number of items in the Locus of Control scale to a smaller set, to identify the variables which form coherent subsets that are relatively independent of one another, and to examine the relationships among various items (Tabachnick and Fidell, 1989). Initial analysis suggested a two-factor model would be appropriate. Confirmatory factor analyses of the items loading on the two factors were conducted using the generally weighted least squares method of LISREL (7.20). Factor loadings, theta deltas, squared multiple correlations, and standardised residuals were examined. The analysis indicated that several items should be excluded resulting in a respecified model which indicated satisfactory weighted least square loadings for the respective factors ranging from .53 to .80. No positive or negative standardised residuals were specified.

The goodness of fit index and the chi-square to degrees of freedom ratio were used to assess the goodness of model fit as suggested by Conger and Kanungo, (1994:447). The calculations produced a chi-square/degrees of freedom ratio of 1.29, a goodness of fit index of .99, (adjusted goodness of fit index of .97), and a root mean square residual of .06. Since the goodness of fit index was above .90 (Jöreskog and Sörbom, 1984) and the ratio was less than five (Marsh and Hocevar, 1985), the two-factor model provides an acceptable fit to the data. The standardised residual of -2.42 was less than the critical value of 2.58 (Jöreskog and Sörbom, 1989:32). Examination of the item groupings in relation to current literature, resulted in factor one being labelled *Internal* Locus of Control, and factor two, *External* Locus of Control. Table 1 presents the details of the confirmatory factor analysis using the generally weighted least squares method of LISREL.

**Table 1**  
**Confirmatory Factor Analysis for the Two-Factor Locus of Control Scale**  
**(N = 251)**

Item No.	Factor Items	$\lambda_x$	R <sup>2</sup>	TD	SE
<i>Internal</i>					
9	I can pretty much determine what will happen in my life	.71	.50	.50	.06
10	I am usually able to protect my personal interests	.80	.64	.36	.06
12	My life is determined by my own actions	.63	.40	.60	.06
<i>External</i>					
2	To a great extent my life is controlled by accidental happening	.65	.43	.57	.06
5	When I get what I want it's usually because I'm lucky	.58	.34	.66	.06
8	Whether or not I get to be a leader depends on whether I am lucky enough to be in the right place at the right time	.53	.28	.72	.06
13	It's chiefly a matter of fate whether or not I have a few friends or many friends	.63	.40	.60	.06

Construct reliability: *Internal* Locus of Control: .76, *External* Locus of Control: .69.

$\chi^2 = 16.78$ ,  $df = 13$ ,  $p = .209$

Goodness of Fit Index = .99. Adjusted Goodness of Fit Index = .97. Root Mean Square Residual = .06

### Construct Reliability of the Factors in the Locus of Control Scale

Construct reliability was calculated based on LISREL confirmatory factor analyses (sum of standardised loadings)<sup>2</sup>/(the sum of standardised loadings)<sup>2</sup> + sum of indicator measurement error where *standardised loadings* were the weighted least squares and *measurement error* was the theta delta scores. Construct reliability for *Internal* Locus of Control was .76 and for *External* Locus of Control: .69. The results were considered satisfactory given the comments by Hair et al. (1995:450) that 'the indicator reliabilities should exceed .50 which roughly corresponds to a standardized loading of .7.'

### Factor Scores

Factor scores were calculated for *Internal* and *External* Locus of Control. A congeneric model or null model was established and factor score regressions were calculated for each item loading on each factor. The sum of factor score regressions was calculated. Each item factor score was divided by the total factor score to give a metric scale. The sum of metric factor scores for all items loading on each factor was 1.0. The raw scores for each case on each item for *Internal* and *External* Locus of Control were multiplied by the appropriate metric measure and the sum provided a factor score for each case on each factor.

## Qualitative Analysis

Around ten per cent ( $n = 25$ ) of the total number of respondents to the questionnaire were interviewed using in-depth, semi-structured interviews. The following questions were included during interviews to elicit comments which could be analysed to reveal the latent content concerning locus of control:

*Has luck played any part in your business;*

*Why do you think you have been successful; and*

*Is it important to maintain control over your business affairs?*

The process of data analysis was commenced by using the indexing and retrieval system in NUDIST (Non-numerical Unstructured Data Indexing Searching and Theorising computer software) which allows constant inspection and review of categories and their content (Richards and Richards, 1994). All data documents were subdivided into single-line text units, the smallest segment of text the program could index or retrieve. Concurrently, an index system was devised which involved developing analytical categories based on the latent variables examined in the quantitative study. Therefore, the literature in the area of discourse and the results from the quantitative analysis provided a conceptual framework for the qualitative analysis (Bryman, Stephens, and Campo, 1996). Broad categories were refined and subdivided as part of the analytical process producing several levels of analysis. Holsti (1969:14) states that 'only the manifest attributes of text may be coded . . . [from which] inferences about latent meanings of messages are permitted.' Thus, aspects concerning locus of control were inferred from an examination of the manifest interview data which were categorised at the second level into *Internal* Locus of Control and *External* Locus of Control. *Internal* comments could not be divided further while *External* comments were categorised at a third level into *External (Destiny)* and *External (Powerful Others)*. Figure 1 illustrates the classification framework used to categorise the qualitative data for the latent construct, Locus of Control.

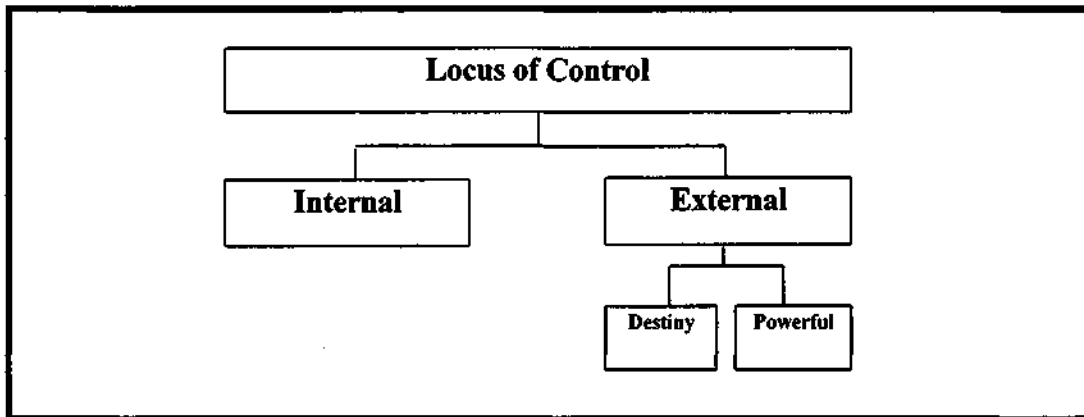


Figure 1: Categorisation framework for Locus of Control data

The face validity of qualitative data relies on the fit between the data and the concepts developed (Dey, 1993). To demonstrate how the concepts and connections identified in the current study are grounded in the data, comments to exemplify the meaning of concepts and themes were provided from the transcripts of interviews. Providing detailed excerpts served to document the researcher's interpretations. Berg (1995) recommends the inclusion of at least three independent examples for each interpretation particularly when using latent variables. This is consistent with the recommendation for

the quantitative technique of factor analysis, where 'every factor . . . must have effects on three or more indicators of that factor' (Bentler and Chou, 1987:93).

The issue of units of data having attributes which could be classified into more than one category highlights the need for multiple classification. However, Weber (1990) recommends single classification where categories are mutually exclusive and data are categorised according to 'best fit' or even omitted where significantly ambiguous. Although this practice maximises validity, excluding data from the analysis may reduce the complexity and richness of the data. In the current study, based on latent variable analysis, a multiple classification system was more appropriate to enable the multi-dimensional nature of the construct to be considered.

### Interrater Reliability

In the current study, interrater comparisons were used to assess face validity and to check that the comments assigned to categories reflect the designated concept. A co-researcher coded "blind" and statistical coefficients of agreement were calculated. The interrater reliability estimate was calculated based on the formula suggested by Goodwin and Goodwin (1985:7), 'number of coding agreements/number of coding agreements plus number of coding disagreements.' *Agreement* meant that raters concurred on the classification of a comment. The mean interrater reliability of .82 was adequate given the suggestion that 70 per cent intercoder reliability is considered satisfactory (Miles and Huberman, 1984). Table 2 provides details of the frequency distribution, percentage frequency distribution, and the interrater reliabilities for each sub-theme in the qualitative data analysis of the latent variable, Locus of Control.

**Table 2**  
**Analysis of Interview Data: Latent Variable Locus of Control**

Theme	f	% <sup>a</sup>	I.R. <sup>b</sup>
<b>Locus of Control</b>			
Internal	17	60.7	.71
External: <i>Destiny</i>	8	28.6	.75
External: <i>Powerful Others</i>	3	10.7	1.00
<b>Theme total</b>			
	<b>28</b>	<b>100.0</b>	

<sup>a</sup> Percentages have been rounded    <sup>b</sup> Interrater Reliability

### Internal Locus of Control

Interrater reliability: .71

According to Spector (1982), individuals who ascribe control of events to themselves are said to be more *Internal* in terms of locus of control; that is, *Internals* look to themselves for direction. A total of 17 comments reflected an *Internal* Locus of Control including:

*I've made this business happen - I built it from scratch and it's all my own doing and I'm very proud of that* (Female, 30 years old, retail gift business commenced August 1993, no employees).

*When things turn out the way you planned or even better, there is a tremendous feeling of pride and of being a self-made person* (Male, 53 years old, property services business commenced January 1993, one employee).

*It's taken a lot to turn my situation around from the sadness and shock and to pick myself up and do this. I'm very proud of my achievements - I've come a long way* (Female, 41 years old, service business commenced December 1992, employs sub-contractors).

The manifest content in the comments above, for example: *I've made this business happen, I built it, [I am] a self-made person, and I'm very proud of my achievements* reflects an underlying theme of respondents personally taking responsibility and credit for their own achievements. The manifest themes provide evidence of respondents believing they have control over events in their lives and that business outcomes are the direct result of their own actions. Therefore, by definition, the comments reflect the latent variable of *Internal Locus of Control*.

### **External Locus of Control**

*External Locus of Control* involves the belief that events are the product of circumstances beyond an individual's control (Miller, Kets de Vries, and Toulouse, 1982; Phares, 1976). Factor analysis of *External Locus of Control* data has led to the development of two sub-scales: A belief that the world is unordered and unpredictable (i.e., a belief in destiny), and a belief in powerful others (Lefcourt, 1981).

#### ***External Locus of Control (Destiny)***

Interrater reliability: .75

*External locus of control (Destiny)* is concerned with the extent to which individuals believe that chance, luck, and fate have a controlling influence in their lives (Levenson, 1974, 1981; Paulhus, 1983). A total of eight comments reflected an *External Locus of Control (Destiny)* including:

*I have been lucky to live in such a beautiful location and to have the talent to make pottery* (Male, 57 years of age, arts and crafts business commenced October 1992, no employees).

*I think I'm lucky to be doing something I enjoy so much* (Female, 29 years old, retail service business commenced September 1993, no employees).

*Through no fault of my own, the whole thing collapsed around me . . . May be we weren't meant to go into business. I think bad luck has played a part* (Male, 29 years old, retail business commenced November 1992, no longer trading).

All the comments mention *luck* and therefore reflect a belief in good or bad luck influencing outcomes in their lives. In other words, in this category, the manifest variable of *luck* provides evidence for the latent variable *External Locus of Control* where the interviewees believe there is an inevitability in terms of outcomes over which they have little or no control.

#### ***External Locus of Control (Powerful Others)***

Interrater reliability: 1.0

*External Locus of Control (Powerful Others)* is concerned with the extent to which individuals believe that powerful others have a controlling influence in their lives (Levenson, 1974, 1981). Where interviewees believe that powerful other people or groups influence outcomes, the comments were categorised as *External Locus of Control (Powerful Others)*. A total of three comments reflected an *External Locus of Control (Powerful Others)*:



*It was probably lucky that the government decided to offer attractive redundancy packages when they did and it was lucky we were both teachers* (Female, 39 years old, with partner, manufacturing business commenced November 1993, no employees).

*Creativity has been important. I must be a little bit blessed with it* (Female, 32 years old, garment manufacturing business commenced November 1992, seven employees).

*God willing, I'll stay in good health and be able to keep the business going the way it is* (Female, 44 years old, food business commenced June 1993, three employees).

These comments refer to the *government* and *God* being viewed as higher powers influencing the outcomes in interviewees' lives and therefore, reflect the latent variable of *External Locus of Control (Powerful Others)*.

### **The Relationship Between Locus of Control Categories**

Several interviewees made comments that could be classified as both *Internal* and *External Locus of Control*. A total of seven comments provided evidence for individuals believing that they have control over events as well as believing that chance or external aspects have a role in their lives. For example:

*I've been very lucky that it's an untapped market . . . but it's been a long, hard slog of not having any life whatsoever* (Female, 32 years old, garment manufacturing business commenced November 1992, seven employees).

*It was lucky that redundancy packages were being offered but I was the one who decided that it was time for a change* (Female, 39 years old, manufacturing business commenced February 1992, three part-time employees).

In both examples, the comments refer to *luck* indicating that the interviewees considered destiny played a part in determining events. The manifest content, for example: *It's been a long hard slog, and I was the one who decided that it was time for a change* conveys the notion that the respondents either took advantage of a situation or worked hard to determine the direction in their lives. These comments reflect the underlying theme of *Internal Locus of Control*. Thus, each example provides evidence for both *Internal* and *External Locus of Control*.

Researchers have tended to refer to 'Internals' and 'Externals' as though the scale was bi-polar (Blau, 1993; Spector, 1988). However, according to Lefcourt (1981:5), an individual can 'believe in the potency of luck and at the same time [have] a belief in the efficacy of effort.' Certainly the interview comments provide some support for the view that individuals may believe that outcomes are affected by a combination of their own actions and aspects over which they have no control.

### **The Relationship Between Quantitative and Qualitative Data**

Researchers studying Locus of Control have tended to refer to 'internals' and 'externals' as though the scale was unidimensional (Kinicki and Vecchio, 1994; Kuypers, 1971; Mitchell, Smyser, and Weed, 1975; Organ, and Greene, 1974). However, both the quantitative and qualitative data in the current study reflect the multi-factor or multi-dimensional nature of the construct. Further, the comments support the approach taken in analysing the quantitative data where factor scores for each respondent on both sub-scales were calculated. Therefore, the analyses of the quantitative and qualitative data support research which suggests that Locus of Control should be considered a multi-dimensional construct (Ashkanasy, 1985; Collins, 1974; Payne, 1993).

Items from the Locus of Control scale used in the current study were those without high loadings on the political control sub-scale identified in previous research (Gurin, Gurin and Morrison, 1978; Levenson, 1981). However, the analysis of comments categorised as *External* locus of control provided evidence that comments could be categorised into the sub-themes of *External (Destiny)* and *External (Control by Powerful Others)*. Thus the analysis of qualitative data in the current study not only clarifies the nature of *External* Locus of Control, but also provides evidence for the multi-dimensional nature of the construct. Further, the qualitative research informs the quantitative process by indicating the relevance of including items from the political domain in future studies of entrepreneurial Locus of Control.

### **Comparison of Qualitative Methods**

The notion that 'many words of text can be classified into much fewer content categories' (Weber, 1985:7) is a central idea in qualitative data analysis. Content analysis has generally relied on examining the data to identify patterns, to develop categories, and to aggregate the content into discernible constructs (Insch et al. 1997). Using this process, theory emerges from a systematic examination of the data and is based on or 'grounded' in the data (Tesch, 1995). Thus, in a grounded theory approach, the process of open coding allows the discovery of categories, their properties, and their dimensions, and category labels are derived from the words and phrases used by the informants themselves (Glaser and Strauss, 1967). This process is a 'bottom-up' approach to the development of inductive categories.

When attempting to integrate quantitative and qualitative data, a 'bottom-up' approach is inappropriate because there is no common theoretical structure. In contrast, the categories used in the current study to identify qualitative latent variables were based on a conceptual framework derived from quantitative research and theory. The classification of data according to latent variables can be viewed as a progressive 'sifting' or 'top-down' process creating several layers of categories from the most general to the more refined. Theory guides the coding decisions until the document is saturated with repetitious codes. The latter method explored in the current study elucidated details which confirm and augment theory and may never have been revealed if traditional content analysis methods had been utilised. However the very detailed links to the data were still retained and thus none of the richness of the data was sacrificed.

### **CONCLUSION**

The purpose of the study has been to illustrate the value of using qualitative analysis of manifest and latent variables to reveal a richness of detail which would not be evident from quantitative analysis alone. The qualitative procedures included in the study provided a means of accessing unquantifiable aspects of the research (Berg, 1995), and captured respondents' personal experiences and perspectives (Patton, 1990). Further, the study demonstrated the importance of using the same level of analysis across methods and in particular, the value of latent variable analysis.

The qualitative analysis produced unanticipated results in relation to the comments concerning *External* Locus of Control (*Destiny*) and *External* Locus of Control (*Powerful Others*). The evidence of these categories is grounded in the data and also confirms theory concerning two sub-scales of *External* Locus of Control (Lefcourt, 1981). Further, the technique described in the current study of using theoretical constructs to provide a framework for qualitative analysis was sufficiently flexible to incorporate additional categories when the examination of data revealed extra themes. The qualitative analysis validated the findings from the quantitative study concerning the multi-factor nature of the construct. In conclusion, latent variable analysis provides a unifying framework across techniques

which enables the integration of quantitative and qualitative methodologies and provides a means whereby the boundaries between the two traditions may become even less distinct.

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