Identifying Student Goal Orientations for the Improvement of Business Education: Results from Classical Test Theory and the Rasch Model

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Abstract. The research reported in this paper focuses on the goal orientations (GO) and, especially the measurement of such orientations, among university business students. Goal orientations are the tendencies or motivations to attain specific, desired results in settings, like universities, where achievement is to be pursued and where failure is to be avoided. Students' goal orientations include Mastery, Master Avoidance, Performance, and Performance Avoidance. Mastery is about a desire to show command of certain subject matter; performance refers to demonstrating one is better than others at accomplishing certain tasks; and avoidance refers to evading the appearance of failure either in the command of materials or in achievements relative to those of others. These orientations are important, particularly to university educators charged with developing more effective instruction. Our objectives in this paper include improving the identification of students' goal orientations and providing better tools, specifically measures and analytical methods, by which to understand such orientations. In the pursuit of these objectives, we re-use a student survey, one originally designed and analysed by means of Classical Test Theory, that was administered to business students at a public university in the United States. In our re-use we employ an alternative test theory, Rasch Analysis (or Modelling), a particular form of Item Response Theory, to provide further insights both into students' orientations and the measures of them. The principal results of our research include finding that students' goal orientations typically require more measurement items than were often previously employed; that Rasch Analysis or Modelling provides important ways of improving goal orientation measurement; and that Rasch Models led us to more effective ways of administering survey methods into business courses.

Keywords:: goal orientation, mastery, mastery avoidance, performance, performance avoidance.

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1 Introduction

A prominently cited need in the education of business students is a better understanding of what students desire to get from a particular course and of their methods for doing so. This cited need is, of course, particularly important to university educators charged with developing more effective instruction. Given this need, our objectives in this paper include improving the identification of students' goal orientations or motivated desires and providing better tools, specifically measures and analytical methods, by which to understand such orientations. In pursuing these objectives, we initially summarize the published literature on the goal orientations of business students, emphasizing recent research results. Then, we discuss in some detail alternative strategies and theories for measuring such orientations. developers. Finally, we present the results from recent research on our own business students' "take-away desires" about the courses we teach.Sample Heading (Third Level). Only two levels of headings should be numbered. Lower level headings remain unnumbered; they are formatted as run-in headings.

2 Students' Goal Orientations: A Literature Review

Achievement goal theory has been used in recent decades to understand how individuals approach and engage in academic and similar competitive activities. Initially, achievement goal theory was conceptualized as a dichotomous framework: mastery goal orientation (M) as a focus on mastering tasks or developing competence, and a performance goal orientation focused on outperforming others, ([1] Archer, 1994; [2] Dweck, 1986). Later this framework was replaced by dichotomizing the performance goal into approach and avoidance components. "Performance approach (P)" refers to the desire to demonstrate ability and outperform others, whereas "performance avoidance (PA)" is about the desire to avoid failure and not being inferior to others, ([3] Elliot & Church, 1997). [4] Elliot and McGregor (2001) proposed a 2 × 2 achievement goal framework by applying an avoidance dimension to a mastery goal (MA). [1] Archer (1994) found that students with a mastery orientation tended to use more metacognitive learning strategies, such as asking faculty or peers to guide their comprehension, while those with a performance orientation relied on superficial learning strategies like rote memorization and surface reading. Lastly, [5] Stodolsky, Salk, and Glessner (1991) pointed to differences in student orientations based on the subject being taught and how it is taught.

Later writings have emphasized how course materials and requirements interact with students' goal orientations. Some students adopt a performance approach opting for completing minimum tasks such as memorizing only what is needed for an exam (([6] Entwistle & Ramsden, 2015). In contrast, others chose a mastery approach to learning in which they seek to show command of course materials. These latter students have an intrinsic interest or enjoyment in carrying out course tasks and in furthering their current learning. Students may use either approach to achieve their goals depending on what is required and the conditions under which they are learning.

This has been referred to as "strategic learning" ([6] Entwistle & Ramsden, 2015; [7] Entwistle &Ramsden, 1982). Strategic learners use 'cues and clues' ([8] Ramsden, 1979) and are motivated by things that enable positive outcomes (e.g., high grades). Accordingly, some studies have shown strategic learners often achieve better learning results and experience less academic stress (see for example [9] Dahl, Bals, & Turi, 2005). Furthermore, there is research evidence suggesting that goal orientations may influence performance after students receive instruction ([10] Porath & Bateman, 2006).

At present, little research exists on the orientations of students enrolled in leadership programs. Rather, current business education research in the United States tends to focus on learning strategies and skills rather than on student motivations and desired course outcomes ([11] Curry, 1999; [12] Aaron & Skakun, 1999; [13] Decker et al., 2021). Yet, the organizational training literature recognizes that students' motivation to learn has a direct impact on learning outcomes ([14] Klein, Noe, & Wang, 2006) and that the frustrations students experience while in professional courses as well as in their perceptions of different teaching methods are likely related to their goal orientations ([13] Decker et al., 2021; [15] Durand et al., 2023).

Finally, despite the literature just discussed in this review section, it must still be noted that goal orientations are not easily measured (see [16] Baranik, Barron, & Finney, 2007). In the section following, we further discuss measurement difficulties.

2.1 Measuring Students' Goal Orientations

Difficulties in measuring students' goal orientations – and, thereby, in providing statistical and other tools for course instructors to understand and address the impacts of such orientations – have much in common with those of other "latent constructs" or "latent variables" (see [15] Durand et al., 2023; [13] Decker et al., 2021; [17] Lazarsfeld P.F. & N.W. Henry, 1968; [18] McCutcheon, A.L., 1987; and [19] Garger, J., 2020). As discussed by [19] Garger, such measurement difficulties include --

> Latent constructs are theoretical; they cannot be observed directly and therefore cannot be measured directly … To measure a latent construct….the researcher must operationally define the latent variable of interest in terms of behavior believed to represent it. As such, the unobserved variable is linked to one that is observable, thereby making its measurement possible.

Thus, student goal orientations are not unlike other latent constructs (e.g., health, intelligence) in measurement difficulty.

As psychometricians are aware, measurement was long-ago defined by [20] Stevens (1946) as the assignment of numbers to objects or events according to a rule. Two alternative theories of how to assign such rules in measuring latent constructs, including student goal orientations, have evolved among researchers. One such theory, known as "Classical Test Theory" or alternatively as "True Test Theory," involves assigning numbers to objects, events, and the like using the following rule:

$$\text{“Actual Observed (survey item, etc.) Score”} = \text{True Score} + \text{Error} \tag{1}$$

Unfortunately, as discussed by [21] Cook (2013), one can never know the "true score" in the assigning of such numbers. As [22] Bond and Fox (2015, p. 301) described it, the true score is a hypothetical, unknown value of the research subject. "The error term" is the error inherent in measurement, the smaller the error the more valid and reliable the measurement. Further, however, the equation immediately above assumes the true score is constant and that changes in it are, therefore, due to error.

In contrast, an alternative measurement theory has developed, one known as "Item Response Theory" (IRT) or "Latent Trait Theory," one form of which is the Rasch Model ([23] Embretson & Reise, 2000, pp. 48-49). This alternative theory employs a completely different assignment rule in measurement. At base, this different rule expresses the likelihood of a "yes" or affirmative answer or correct answer among research subjects to a test or a survey item. It is a function of how much of the latent construct or trait they have and the difficulty of the item. Thus, the Rasch model predicts that this likelihood depends on the difference between the ability of the subject and the difficulty of the item. The reader interested in a more formal, mathematical expression of this should see [21] Cook, 2013; [23] Embretson and Reise, 2000, pp. 48-50; [22] Bond & Fox, 2015, especially pp. 309-311, 349-350).

Two additional points about the Rasch Model should be noted. First, the Model affords a comparison between what actually happened and what the model estimates should happen. Thus, unlike Classical Test Theory, the underlying Rasch model is "falsifiable." Secondly, Rasch Model statistics provide for person-reliability, test or survey-item reliability, as well as ones for establishing construct validity. (See especially [23] Embretson and Reise, 2000, pp. 48-50; [22] Bond & Fox, 2015, especially pp. 309-311, 349-350; [24] Andrich, 1988; and [25] Granger, 2008.) These statistics are discussed further below.

3 Data and Methods

To pursue the principal objectives of this paper, we designed a survey instrument for administration to students in business enrolled at a major public university. Out of abundant caution for the influences of differing backgrounds – especially prior work experience, gender, age, and ethnicity -- we also included survey measures of these characteristics.

The survey instrument itself was based upon the literature review discussed above and especially the work done by [13] Decker et al. 2021, [16] Baranik, Barron, & Finney, 2007; [26] Chen, Gully, & Eden, 2001; [14] Klein et al., 2006; and [27] Pilgrim et al., 2018). Questions included on the instrument were largely five-item, Likert-type queries consisting of multiple measures of each individual construct of interest in this study, particularly, the goal orientations of mastery, mastery avoidance, performance, and performance avoidance.) All questions, the survey instrument, and the methods of administering the instrument, including subject selection, were reviewed and approved by the university's Institutional Review Board (IRB). The survey instrument was administered online (Qualtrics) to a total of 393 students recruited from classes during the 2021-22 school year.

Initially, results from the survey were analyzed for missing or incomplete student responses. Such missing responses were found to be few in number, five (5) or fewer per survey question. However, to avoid a cumulative impact of "case-wise deletion" in analysis and the resulting possibility of subject selection biases, procedures recommended by [28] McKnight, McKnight, Sidani, & Figueredo (2007) for handling missing survey responses were followed. Such procedures included diagnostics, determination of non-random biases, and mean substitutions (see especially p. 173-174).

Following the initial analysis for missing or incomplete responses, we examined the reliability and validity of survey items. In our initial analysis, we did so by utilizing statistical models commonly employed in Classical Test Theory (e.g., Pearson product-moment correlations, Cronbach's Alpha). We then investigated whether we could improve our understanding and measurement of student goal orientations using statistical models employed commonly in Rasch modelling (i.e., item separation, fit statistics, instrument targeting, person separation). The reader interested in further discussion of these models should consult [22] Bond & Fox, 2015, [23] Embretson & Reise, 2000).

4 Results

In this section student goal orientation results derived from the analytical methods and models discussed immediately above are reported, starting with reliability and validity.

Table 1. Correlations among constructs.

	Mastery	Mastery Avoidance	Performance	Performance Avoidance
Mastery	1.000*			
Mastery Avoidance	0.138*	1.000*		
Performance	0.113*	0.198*	1.000*	
Performance Avoidance	0.038	0.380*	0.380*	1.000*

Table 2. Item reliability: Cronbach's Alpha.

Mastery	MasteryAvoidance	Performance	Performance Avoidance
0.76*	0.86*	0.85*	0.75*

* Differs from zero at statistically significant levels (see below).

All of the validity coefficients in the Table 1 were found to differ from zero at statistically significant levels (p>+/-.05), and all items for each construct were found to be unidimensional and correctly categorized. As shown in Table 2, all Cronbach's Alpha coefficients were found to differ from zero at statistically significant levels and were found to be at least "acceptable" with values of .75 or higher. (According to ([29] Ursachi et.al., 2015 and others, a score of .7 is considered "acceptable" in the social sciences.) Thus, we concluded that the survey items as categorized in this paper and based on the responses of individuals reported in Appendix A were both valid and reliable according to the statistical models of Classical Test Theory.

However, our expectation was that using Rasch Models would provide additional information and improved measurement precision about the student goal orientations of interest in this paper. Accordingly, using the survey data on the same identical 393 students reported above and Rasch Model software for computations, we generated the statistical results presented below.

4.1 Reliability and Separation for Persons and Items

In Rasch modelling "person reliability" is an estimate of the replicability of persons (subjects) expected if they were given another set of survey items measuring the same construct. "Person separation," on the other hand, is an estimate of the spread of persons on a measured variable. In contrast, "item reliability" and "item separation" are comparable statistics but for survey items rather than individuals (see [22] Bond & Fox, 2015; [23] Embretson & Reise, 2009). Tables 3 and 4 below show the statistical results for persons and items, respectively, by student orientation for the data we gathered from our students.

Table 3. Rasch Model findings on person reliability and separation by student orientation.

	Mastery	Mastery Avoidance	Performance	Performance Avoidance
Person Reliability	0.61	0.81	0.82	0.65
Person Separation	1.24	2.06	2.12	1.30

Table 4. Rasch Model findings on item reliability and separation by student orientation.

	Mastery	Mastery Avoidance	Performance	Performance Avoidance
Item Reliability	0.96	0.88	0.97	0.93
Item Separation	5.16	2.75	5.96	3.75

As seen in Table 3, on only two of the orientations –Mastery Avoidance and Performance – were students found to be rather differentiated by their respective construct measures. This is shown both by the person reliability and personal separation scores. We hypothesize that the other two orientations (Mastery and Performance Avoidance) were not found to be differentiated well by their respective measures owing to a limited number of survey questions and to negative question wording. (We return to this hypothesis below.) On the other hand, as shown in Table 4, the items were found rather well separated.

4.2 Scale Functioning

In our data analysis using Rasch modelling we next analysed scale functioning. In doing so, we used a rating model in which all construct items utilized the same estimated scale (as opposed to a partial credit model; see [22] Box and Fox, 2015, 146-156 for further details.)

As shown in Table 5, many lower item categories (disagree and strongly disagree) received few responses, so estimating a scale for each item would have been problematic. Even after using a unified scale for all items in each construct, however, some category counts remained low. The Infit (degree of misfit of observations to the expectations of the Rasch model) and Outfit (residuals' degree of scores' irregular sensitivity to off-target response patterns) for each construct's response set were found generally good, though the fit scores for some of the first categories, with fewer observed responses, are somewhat elevated.

Table 5. Scale functioning.

Construct	Response	%	%	Observed Average Measure	Sample Expected	Infit MNSQ	Outfit MNSQ
Mastery	1	27	1	-0.37	-0.57	1.20	1.25
	2	81	4	0.05	-0.02	1.09	1.16
	3	191	10	0.48	0.57	0.89	0.84
	4	694	35	1.46	1.47	0.98	0.91
	5	970	49	2.82	2.79	1.05	1.00
Mastery Avoidance	1	78	4	-1.63	-1.88	1.35	1.54
	2	276	14	-0.78	-0.74	1.01	1.10
	3	345	18	0.13	0.21	0.82	0.80
	4	837	43	1.49	1.46	0.90	0.91
	5	429	22	3.11	3.11	1.04	0.99
Performance	1	166	8	-1.75	-1.87	1.22	1.37
	2	262	13	-1.00	-0.98	0.95	0.96
	3	568	29	-0.17	-0.07	0.83	0.82
	4	651	33	1.27	1.17	0.86	0.89
	5	318	16	3.00	3.06	1.24	1.12
Performance Avoidance	1	113	6	-0.33	-0.59	1.38	1.58
	2	213	11	-0.23	-0.10	0.85	0.80
	3	261	13	0.29	0.33	0.79	0.71
	4	697	35	0.91	0.90	1.01	0.99
	5	681	35	1.76	1.75	1.00	0.99

Table 6. Mastery scale for two items.

Item	Response	Count	%	Mean Ability	S.E. Mean	Infit MNSQ	Outfit MNSQ
3 M Happy to learn	Missing	2	1	4.81			
	1	8	2	0.39	0.20	1.70	1.80
	2	32	8	0.54	0.17	1.60	1.70
	3	41	10	0.83	0.14	1.10	1.10
	4	128	33	1.55	0.10	1.10	1.00
	5	182	47	3.74	0.11	1.20	1.10
13 M School work to improve	1	3	1	0.62	0.20	2.40	2.30
	2	15	4	0.24*	0.19	1.10	1.10
	3	43	11	0.56*	0.13	0.90	0.90
	4	156	40	1.60	0.09	1.10	1.10
	5	176	45	3.77	0.11	1.20	1.10

Table 6 shows scale details for the two worst-performing items in the Mastery construct. For both items, the response for category 1 shows the poorest fit. For Item 3, the fit for category 2 is also not good. For Item 3 the mean ability for respondents choosing category 2 is lower than for respondents choosing category 3. For this item, then, the mean for category 1 is more similar to category 3, the "middle" category.

For all items on the questionnaire, categories 1 and 2 received relatively few responses, indicating that all items are relatively easy to endorse. For Mastery items, approximately 80 to 90 percent of responses were for agree or strongly agree; for the other three goal orientations, most items had approximately 65 to 80 percent agree or strongly agree responses. Thus, goal orientation measurement could be improved by including items that are more difficult to endorse.

Finally, Figures 1 to 4 show the category probability curves for each goal orientation. The ideal situation is for all middle category curves to peak at approximately the same probability. In addition, each curve should be the most likely response at some range of measures. For Mastery, and Mastery Avoidance, the middle category is the most likely response over a quite narrow range and the peak probability is lower than for the other categories. For Performance Avoidance, the middle category was never found the most likely for any respondent. Forcing respondents to either agree or disagree may improve the scale functioning. More difficult to endorse items may help to better define the lower categories.

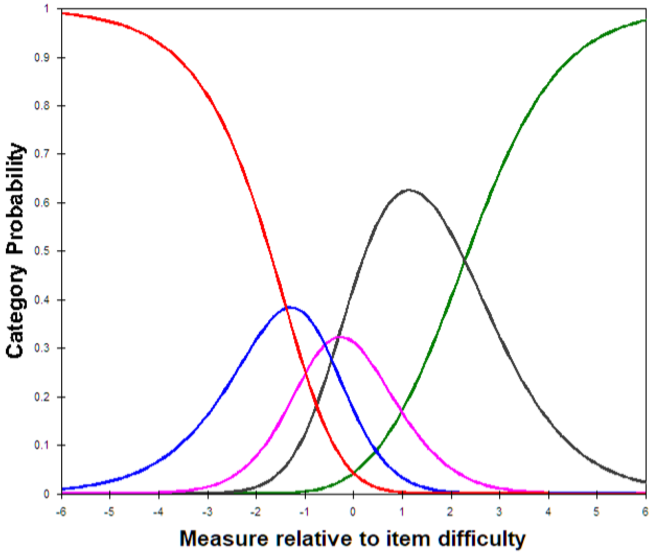

Fig. 1. Mastery: Category probability curves.

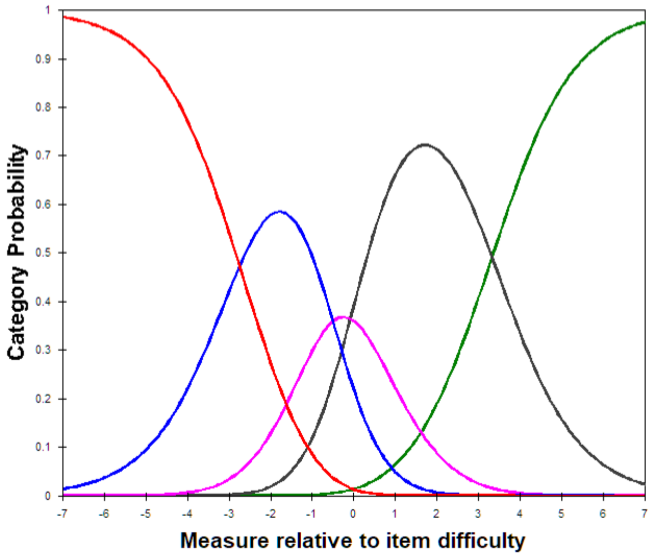

Fig. 2. Mastery Avoidance: Category probability curves.

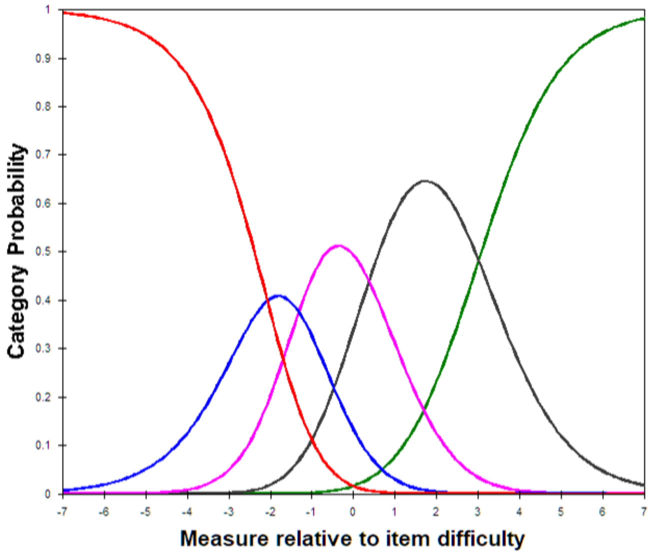

Fig. 3. Performance: Category probability curves.

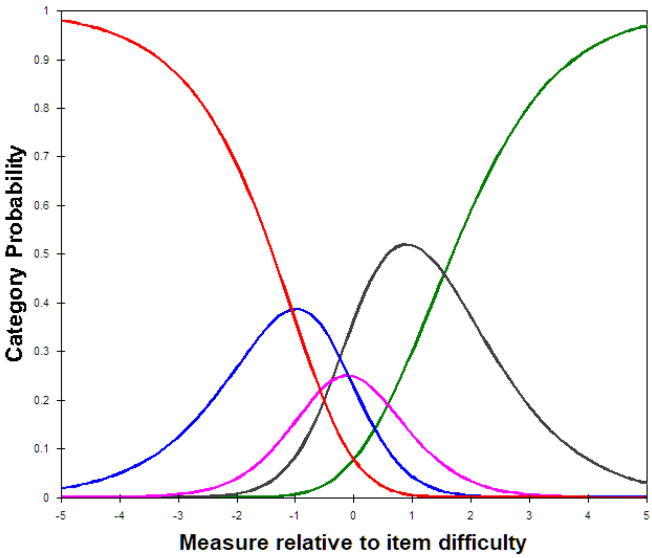

Fig. 4. Performance Avoidance: Category probability curves.

4.3 Fit to the Rasch Model

As discussed above, Rasch models specify probabilities or likelihoods that afford a comparison between what happened and what the model estimates should happen. Expressed differentially, unlike Classical Test Theory, the underlying Rasch model is "falsifiable." As briefly noted in the preceding section of this paper, important statistics about the match or fit between the theoretical expectations of the Rasch model and actual, observed observations (i.e., in the present case survey data about student orientations) are central to analysis. These important statistics come in two different general forms, "item" and "person," both of which are reported in more detail in this section ([22] Bond & Fox, 2015, p. 361-369; [23] Embretson & Reise, 2009, Chapter 9).

In the tables immediately below, we report further evidence on item measures and fit by student orientation.

Table 7. Item measures and fit: Mastery.

Item	Measure	Model SE	Infit MnSq	Infit Z Std	Outfit MnSq	Outfit Z Std
3 M Want to learn	0.38	0.08	1.38	3.85	1.35	3.75
7 M Work hard to learn	-0.59	0.10	0.97	-0.23	0.91	-0.93
10 M Understand contents	-0.49	0.09	0.84	-1.62	0.74	-2.88
13 M School work to improve	0.14	0.08	1.05	0.54	1.05	0.59
19 M Complete mastery	0.56	0.07	0.85	-1.84	0.88	-1.55

Table 8. Item measures and fit: Mastery Avoidance.

Item	Measure	Model SE	Infit MnSq	Infit Z Std	Outfit MnSq	Outfit Z Std
4 MA Concern Not Learn	0.12	0.08	1.12	1.55	1.17	2.12
11 MA Afraid not understand	-0.47	0.08	1.16	1.92	1.05	0.59
14 MA Anxious not mastering	0.10	0.08	0.91	-1.14	0.98	-0.23
16 MA Worry not learn enough	0.15	0.08	0.75	-3.53	0.78	-3.08
18 MA Uneasy not understanding	0.09	0.08	1.04	0.52	1.03	0.44

Table 9. Item measures and fit: Performance.

Item	Measure	Model SE	Infit MnSq	Infit Z Std	Outfit MnSq	Outfit Z Std
5 P Show intelligence	0.56	0.07	2.05	9.90	2.13	9.90

9 P Compete others	-0.87	0.08	0.84	-2.24	0.82	-2.40
15 P Perform above others	0.20	0.07	0.71	-4.38	0.75	-3.64
17 P Do better than others	-0.14	0.07	0.59	-6.50	0.58	-6.54
21 P Better grades than others	0.25	0.07	0.73	-4.00	0.74	-3.86

Table 10. Item measures and fit: Performance Avoidance.

Item	Measure	Model SE	Infit MnSq	Infit Z Std	Outfit MnSq	Outfit Z Std
2 PA Fear performing poorly	0.09	0.06	1.12	1.57	1.20	2.32
6 PA Not look stupid	0.30	0.06	1.14	1.92	1.12	1.46
8 PA Appear cannot do classwork	0.17	0.06	0.91	-1.27	0.89	-1.43
12 PA Avoid bad performance	-0.34	0.06	0.86	-1.79	0.83	-2.03
20 PA Avoid poor performance	-0.23	0.06	1.07	0.84	0.99	-0.04

An examination of the fit (Infit and Outfit as defined in the preceding section of this paper) data in the above tables revealed to us the following key points. In the Mastery table (Table 7), Item 3 has values somewhat greater than 1.0, indicating more variation in the actual, observed data than predicted by the Rasch model. In addition, the items have a somewhat narrow range of measures: 1.15 logits. In the Mastery Avoidance table (Table 8), four of the items (3, 14, 16, and 18) had essentially the same measure. Data in the Performance table (Table 9) revealed to us a somewhat narrow item difficulty range (-.87 to 56 or 1.43 logits); a quite poor fit for Item 5; as the Infit Mean Square statistic has a mean of approximately 1.00, the poor fit for Item 5 is likely causing the overfit in the other items. Finally, the measure data in the Performance Avoidance table (Table 10) were most revealing of a narrow range of Item difficulty (-.34 to .30 or .64 logits). *All of these results suggest important changes to the measurement of students' goal orientations, changes that appear likely to improve understanding of business students' motivation in a course.*

4.4 Instrument Targeting

One of the advantages of using Rasch Models over Classical Test Theory is the enabling of "instrument targeting." Such targeting refers to a qualitative examination of the match between the subjects – students in this case – and the items being used to observe them. Expressed somewhat differently, it is about comparing the estimated difficulty of items (survey items in this case) and estimates of the ability of subjects. While such an examination is fundamentally qualitative in nature, a number of statisticians have argued that targeting adds considerable analytical insights into quantitative results (see especially [22] Bond & Fox, 2015, p. 74 and [24] Andrich, 1988, especially pp. 65-66).

Instrument targeting involves either most commonly the use of Wright Maps that show many item-person relationships in a pictorial way or less commonly used, matches the means and standard deviations of items with those of persons. For reasons of clarity and elegance of presentation – particularly of where misfit is most pronounced -- we opted for the Maps over statistical matching below. As discussed by [22] Bond & Fox, 2015, pp, 138 and 372, and by [23] Embretson and Reise, pp. 98-99, a well-targeted measurement instrument (e.g. student goal survey) has item distributions that match well the range of test or survey subjects' abilities.

In the charts below, persons and items are located on Wright Maps according to estimates of abilities and item difficulty for each student goal orientation. The Wright Maps show thresholds (usually identified as Andrich thresholds), which are related to the points on the agree—disagree scale, adjusted for each item's location. Since each item in a given goal orientation uses the same scale, when the item locations are nearly the same, the thresholds will also be nearly the same. This phenomenon is easily observed in the Wright Map for Mastery Avoidance in Figure 6, below, in which four or five thresholds are in nearly the same locations.

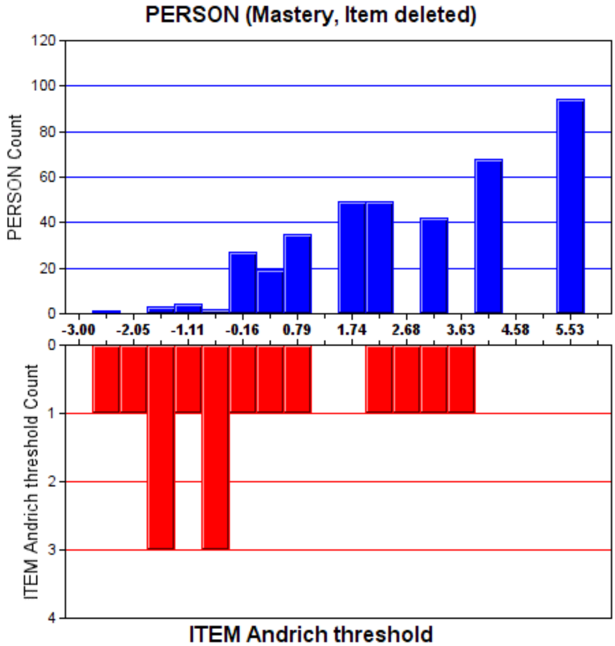

Fig. 5. Targeting: Mastery Goal Orientation.

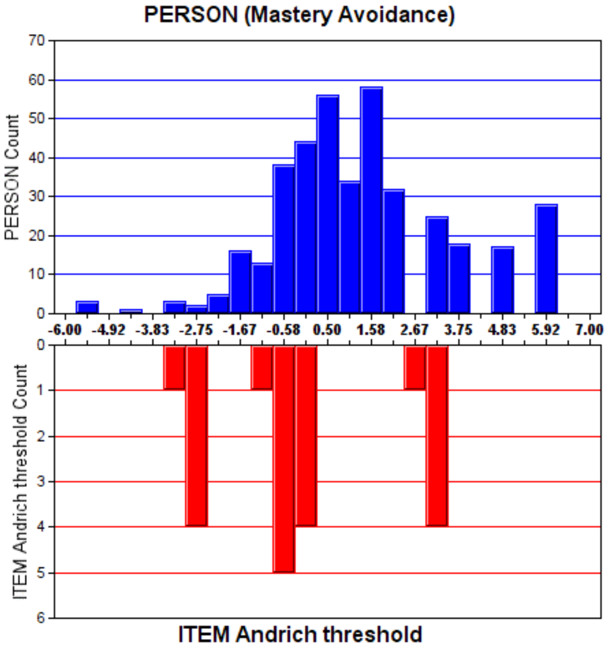

Fig. 6. Targeting: Mastery Avoidance Goal Orientation.

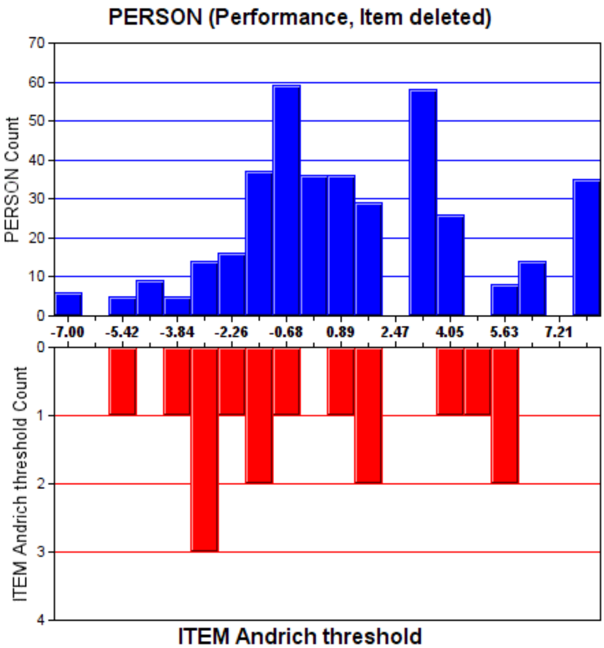

Fig. 7. Targeting: Performance Goal Orientation.

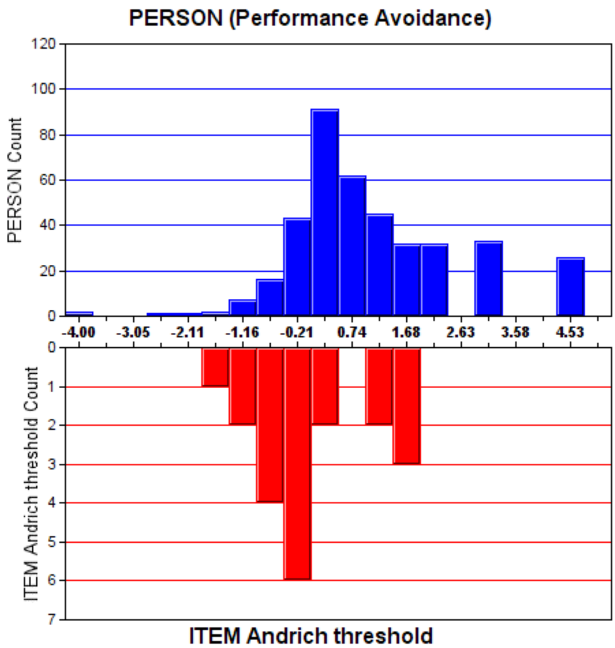

Fig. 8. Targeting: Performance Avoidance Goal Orientation.

Our examination of the data shown in the above charts led us to the following observations and interpretations about the targeting of our instrument. Note the placement of thresholds in comparison to the bulk of respondents. Many thresholds are dividing concentrations of relatively few respondents while many concentrations of persons have few or no thresholds near those positions. For the Mastery construct we found poor targeting of our survey items. While we found targeting of the Performance orientation items to involve a better match between items and persons, it still was not "excellent" in our view. We considered the targeting of Mastery Avoidance to be poorly targeted by our survey instrument while judged that Performance Avoidance needed improvement.

4.5 Person measures

"Person measures" depend on the quality of the items, and the items depend on the characteristics of the respondents. A summary of the person measures is presented in Table 11. It is not possible to know the actual measure of respondents whose total score is the maximum or minimum on a particular goal orientation. (The Winsteps program provides an estimated measure for these extreme response sets.) The data below is for non-extreme respondents, i.e. people who have not responded 'strongly agree' or 'strongly disagree' to all questions.

Table 11. Summary of Non-extreme Person Measures.

	Mastery	Mastery (Item deleted)	Mastery Avoidance	Performance	Performance (Item deleted)	Performance Avoidance
Average Measure	1.74	2.10	1.03	0.53	0.72	0.87
Minimum SE	0.46	0.56	0.53	0.54	0.76	0.41
Maximum SE	1.11	1.17	1.11	1.11	1.19	1.07
In&Out MnSq >1.5 (n)	58	51	66	83	66	71
Real Person Reliability	0.59	0.58	0.77	0.79	0.82	0.59
Real Person Separation	1.20	1.18	1.82	1.92	2.15	1.20

As seen in the table, the average person measure for all goal orientations is well above 0.0, its centered value, providing another indication that the targeting of the questionnaire is not optimal. In addition, the large standard errors are notable. The person separation, which is related to reliability, is an estimate of how many groups the respondents can be divided into. Only the Performance goal orientation, with one item deleted, divides the respondents into two groups.

5 Summary and Discussion

In summary, a prominently cited need for a better understanding of what business students desire to get from a particular course and how they go about it led us to pursue two objectives in this paper: improving the identification of students' goal orientations as well as providing better measures and analytical methods for the enhancement of instructional development. In a previous paper the authors of this paper utilized Classical Test Theory as a basis for research to accomplish these objectives. In this paper we sought to advance our earlier work by adopting a different measurement approach: the application of the Rasch Model.

Our principal finding in this paper is that the use of Rasch modelling offered considerable insights into an understanding and the measurement of business students' goal orientations quite over and above those we found previously by using Classical Test Theory. More specifically, we found that the Rasch Model approach advanced our understanding and measurement through its focus on the reliability and separation for persons and test (survey) items; about "falsifiability" and the fit between the theoretical expectations of the Rasch model and actual, observed observations; and on instrument targeting.

Finally, based on our findings and the insights we derived from Rasch Modelling, we are now revising our measures of the goal orientations of business students by –

- enlisting students with developing measurement items in accord with their own expectations,
- conducting student feedback session when survey results seem inconsistent with their own experiences, and
- following the advice of [24] Andrich (1988, p. 86),

> When the Rasch model is intended to hold because of its special measurement properties, failure of the data to conform to the model implies further work on the sustentative work of scale construction, not on the identification of a more complex model that might account for the data.

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