A SENTENCE COMPLETION TASK FOR ELICITING PERSONAL CONSTRUCTS IN SPECIFIC DOMAINS

James W. Grice[1], Edward Burkley III[2], Melissa Burkley[2], Sara Wright[3], Jennifer Slaby[4]

[1] Oklahoma State University , [2]University of North Carolina Chapel Hill, [3]University of Iowa, [4]Nevada Missouri

A novel sentence completion task was developed to assess how individuals view themselves and others in different domains of experience. This task was incorporated into a repertory grid and evaluated in two studies. In the first study, ratings obtained from the grid procedure were shown to be internally consistent and reliable over time in two distinct domains of experience: mathematics and athletics. Moreover, ratings for oneself in the grids for each domain were found to be highly correlated with corresponding subscale scores from a popular multidimensional measure of self-concept. In the second study, the repertory grid ratings were again shown to be internally consistent and to yield information that was truly distinct across the domains of mathematics and athletics. Positive ratings for oneself in the grids were again shown to correlate highly with corresponding subscale scores from the same multidimensional measure of self-concept. The theoretical and methodological implications of these results and new procedures were discussed.

Keywords:*sentence completion, self-concept, idiographic*

INTRODUCTION

Since the 1980s self-concept researchers have developed and promoted hierarchical and multidimensional models of the self (see Byrne, 1996). These models have essentially replaced the monolithic view of self-concept with more complex schemes that subdivide the self based on different domains of experience. For instance, Marsh's (1990; Marsh & Hattie, 1996) hierarchical model subdivides a person's general self-concept - the apex of the hierarchy - into twelve primary domains of self-concept including mathematics, athletics, and physical appearance. Bracken's (1996) multidimensional model similarly incorporates specific components of the self based on different domains of experience, such as family life, interactions with friends, and participation in education. The sum of experience in these different domains or contexts yields a given individual's general self-concept. By extending beyond a monolithic viewpoint, these models offer greater flexibility for studying the role of self-concept in specific domains of experience.

Personal construct researchers have also been aware of the importance of domain specificity when studying how individuals construe themselves and their surroundings. From the perspective of Personal Construct Theory (PCT, Kelly, 1955), the elements (people, places, things, etc.) that comprise a given situation cannot be disentangled from the personal constructs (bipolar dimensions of discrimination) an individual will use to make sense of that situation (see Bonarius, 1977). Hence, when studying a particular domain of experience personal construct psychologists have long realized that it is of utmost importance to examine the specific constructs that each person brings to bear on the given experience. Examples of this approach can be seen in Brook's (1991) study of work self-concept and Neimeyer and Hall's (1988) study of self-image in the context of marriage. Other researchers have studied individuals' constructions in the domains of teaching (Shapiro, 1991), studying physics (Winer & Vázquez-Abad, 1997), and group problem solving (Morçöl & Asche, 1993). In each of these studies the participants were asked to provide and apply personal constructs that were relevant to the specific domain of experience under investigation.

Against this background it is perhaps surprising that personal construct psychologists have not devoted more resources to developing and testing stan-

dardized methods for explicitly eliciting personal constructs in different domains. While Kelly (1955) did modify his original triadic elicitation procedure in his Role Construct Repertory Test to elicit constructs relevant to interpersonal relationships or self-identity, he did not present methods for eliciting constructs in highly specific and varied domains of experience. While it is conceivable that the triadic method could be modified to accommodate different contexts, such alterations may extend beyond the flexible boundaries of Kelly's original method. Furthermore, Epting, Probert, and Pittman (1993) reviewed most of the extant procedures for eliciting personal constructs and concluded that a number of procedures are generally less confusing and simpler to employ than Kelly's triadic procedure. None of the procedures reviewed, however, were designed to elicit personal constructs in specific domains of experience. In the present paper we introduce a modified repertory grid procedure based on a sentence completion task that is highly flexible, yet structured so that it can be easily programmed into a computer. Below, we evaluate this new procedure in two studies designed to assess the reliability and validity of the data it produces in two distinct domains of experience. We finally discuss how this technique could prove useful for self-concept, self-discrepancy, and semantic space researchers.

Sentence Completion Grid

McAdams (1990, 1993) proposed a model of identity that views the self as a continually unfolding story with a distinct narrative structure. By examining someone's 'life story' a psychologist can bear witness to the ideological setting, imagoes, nuclear episodes, and generativity script which comprise that individual's identity. This approach is akin to Kelly's (1955) self-characterization technique in psychotherapy and is reminiscent of Allport's (1965) *Letters from Jenny*, where he discovered the themes and idiosyncratic nuances of Jenny Gove Masterston's identity woven into the fabric of her written correspondences. A single sentence within Jenny's letters is essentially a fragment of her larger, more complete life story. The implication for construct elicitation is that people may find it more natural and meaningful to respond to a procedure that emulates the narrative aspect of the self (cf., Epting, Probert, and Pittman, 1993), such as a sentence completion task.

The Rotter Incomplete Sentences Blank test (Rotter & Rafferty, 1950) represents one of the more notable uses of a sentence completion task to obtain psychological data. The appeal of this procedure is that it generates idiographic information in a highly efficient manner. In a sense, it is like a structured interview that forces an individual to cull the 'essential' verbal statements from his or her larger narrative response. Interestingly, sentences not only offer structure, but flexibility as well. The most recent advances in computer-adaptive ability testing (Embretson, 1999) reveal that word problems can be used to create an unlimited pool of items. Parts of a single problem are identified as 'variants' which can be replaced with alternate forms of variants without changing the essential nature of the question. A small number of problems (composed of sentences) with a small number of variants can thus be used in different combinations to produce a large number of *item clones* that make up the item pool. This logic can be followed to construct sentences for eliciting constructs in different domains. For example, the sentence, "While *sitting in a math class* I feel _____" can easily be altered by replacing the italicized, variant portion of the sentence, "While *exercising in a gym class* I feel _____", or "While *on a romantic date* I feel _____." Different individuals can also be referenced in the sentence, representing the people who play important roles in the self narrative (McAdam's imagoes, 1990, 1993). From the perspective of PCT, the roles we play with others have a powerful and sweeping impact upon our construct systems. It is no secret that Kelly (1955, *p*. 179) considered this point to be so important that he initially referred to his approach as 'role theory.' These significant others may provide the means for eliciting constructs that are central to an individual's self-concept. Most people can think of at least one person whom they admire or consider to be successful in a particular domain. This individual can be included as the subject of the sentence above, "While *sitting in a math class* Dick feels _____." A person who is considered as unsuccessful may also be included in the sentence. In this manner the sentence completion task would allow individuals to think about themselves and people whom they know personally in a way that clearly contrasts different qualities.

Completing a repertory grid entails rating or ranking a series of elements on elicited constructs. Indi-

viduals can be asked to make judgments regarding the self, possible selves (e.g., undesired self, future self, past self, etc.), and others relative to the construct dimensions. The ratings or rankings are typically recorded in matrix or 'grid' form in which the rows are comprised of constructs and the columns are comprised of elements. Employing construct dimensions from the sentence completion task described above will yield a *sentence completion grid* of values that reflect each individual's unique constructions of the elements in a targeted domain of experience. Like any other repertory grid, the values in the sentence completion grid can be analyzed using a variety of statistical or mathematical models. The psychometric qualities of the ratings or rankings in the grid can also be examined via traditional analysis strategies. In two studies reported herein we in fact evaluated the reliability and validity of data obtained from this novel sentence completion grid procedure. In the first study, we asked two groups of participants to complete grids in one of two distinct domains - mathematics and athletics - on two test occasions. We then assessed the test-retest reliability of ratings obtained for the grid elements (viz., self and others), and we assessed the internal consistency of ratings obtained for the particular self element. The convergent and discriminant validities of the self ratings were also examined by comparing the results to a popular and well established measure of self concept, Marsh's Self Description Questionnaire - III (SDQ-III, 1989). The grid ratings in both domains were expected to be highly consistent across the two test occasions. Moreover, the ratings for the self in the mathematics grid were expected to correlate highly with the corresponding mathematics subscale of the SDQ-III; whereas ratings for the self in the athletics grid were expected to correlate highly with the corresponding physical ability subscale. Based on Marsh's (1989, 1990) model of self concept and published results for the SDQ-III, we expected the self ratings for the mathematics and athletics grids to be at best modestly correlated with non-corresponding subscales from the SDQ-III.

In the second study, we asked one sample of participants to complete two sentence completion grids: one in the domain of mathematics, and one in the domain of athletics. The results from the grids for the two domains were then compared directly, and the overall pattern of ratings for the elements were expected to differ. Consistent with Marsh's model of self concept, the grid ratings for the particular self element in the mathematics and athletics grids were also expected to be nearly orthogonal. Furthermore, convergent and discriminant validity for the self ratings was again assessed by comparing the results to responses on the SDQ-III. As in the first study, the self ratings for the mathematics and athletics grids were expected to be significantly correlated with their corresponding SDQ-III subscales, and at best modestly correlated with the non-corresponding subscales.

STUDY 1

Methods

Participants

Ninety-eight undergraduate students (21 males and 74 females, 3 individuals failed to report gender) with a median age of 19 years (M = 20.6, SD = 5.0) participated in this study in exchange for course credit. Most of the participants (75.5%) were Caucasian, 13.3% African American, 4.1% Hispanic, 3.1% Asian, and 4.0% reported their ethnicity as 'other' or chose not to respond. Each participant completed, in random order, Marsh's Self-Description Questionnaire - III (SDQ-III; 1989) and a sentence completion grid on each of two occasions approximately one week apart. The SDQ-III was administered as a paper-and-pencil test and one of two versions of the grid task - mathematics or athletics - was administered on both occasions via computer with a beta version of Idiogrid (Grice, 2002a). Half of the individuals completed the mathematics grid on both occasions, and half completed the athletics grid. Due to participant attrition or non-responding, however, complete data were obtained for forty-five (n = 45) and forty-two (n = 42) of the participants in the mathematics and athletics groups, respectively.

Instruments

Self-Description Questionnaire - III. The Self Description Questionnaire (SDQ-III; Marsh, 1989) is a self-report questionnaire consisting of 136 items that are rated on an 8-point Likert-type scale. It is comprised of thirteen subscales that assess general self-concept and twelve specific domains of self-concept:

mathematics, physical ability, opposite sex peers, religion, honesty, verbal, emotion, parent, academic, problem solving, physical appearance, and same sex peers. Marsh reports internal consistency coefficients that range from .72 to .95 for the thirteen subscales across four different test occasions, and one-month test-retest reliabilities that range from .76 to .94 (*p*. 70). As will be reported below, the internal consistency and stability of the SDQ-III item and subscale scores for the current sample of individuals were similar to those reported by Marsh.

Sentence Completion Grid. Each participant completed one of two repertory grids designed to assess each individual's construction of self and others in two distinct domains: mathematics and athletics. Mathematics was described to the participants as, "...any activity involving the manipulation of numbers, such as simple addition and subtraction or more complex procedures such as algebra or calculus." Athletics was described as, "...both physical activities (such as aerobics) and competitive sports (such as basketball). In other words, any activity involving general coordination and physical ability." The procedures for administering the two grids were highly similar; hence the mathematics version of the grid will be presented first, followed by a brief description of the unique components of the athletics grid.

The participant began the automated grid task by first entering the name of an individual other than himself or herself considered to be successful in the domain of mathematics. The participant also entered the name of a person thought to be unsuccessful in mathematics and the name of a close friend. Duplicate names were not allowed. After detailed instructions and a single practice trial, a twelve-item sentence completion task was administered that addressed the participant's feelings, values, and perceived performance levels in the area of mathematics. The sentences, in the order presented, were:

1. While *sitting in a mathematics course* I feel _____.
2. Succeeding in *mathematics* makes (successful person) feel _____.
3. *Mathematics* makes (unsuccessful person) feel _____.
4. While *doing his/her mathematics homework*, (successful person) feels _____.
5. (Unsuccessful person) does not succeed in *mathematics* because he/she _____.
6. Compared to other *courses*, I perform _____ in *mathematics*.
7. The one thing that people who succeed in *mathematics* have in common is
   a. that they are _____.
8. Succeeding in *mathematics* requires a person to be _____.
9. Knowing how to succeed in *mathematics* is _____.
10. Succeeding in *mathematics* makes me feel _____.
11. (Successful person) values *mathematics* because *it is* _____.
12. I value/do not value *mathematics* because *it is* _____.

The first names of the successful and unsuccessful individuals were automatically placed in the sentences where indicated. Participants typed their response to each sentence as a single word or short phrase in the space provided (up to 35 characters were allowed). They were also queried for the opposite of their initial response to each sentence (e.g., *sad* might be typed as the opposite of *happy*). Although participants were not explicitly prevented from entering duplicate responses, a list of the constructs was continually updated on the computer screen along with a message reminding the participant not to enter duplicate responses. The computer program then constructed seven-point bipolar rating scales anchored by the participant's words or short phrases. The midpoint of each scale was labeled as "uncertain or does not apply." Portions of the sentences were also used to create stems for the scales (e.g., "Use the scale below to rate how you feel while sitting in a math class:" for the bipolar adjectives elicited from the first sentence). After four practice trials, the partic ipants rated eight people, or elements, on each of the scales. The eight elements, in order or presentation, were: "self", "unsuccessful person in math", "ideal self", "successful person in math", "undesired self", "friend", "self 1 year from now", and "typical student." The ideal self was defined as, "yourself as you would really like to be", and the undesired self was defined as "yourself as you would NOT like to be." These elements are similar to those commonly found in studies of semantic space (e.g., Hart, Fegley, & Brengelman, 1993; Ogilvie, 1987). The result of the grid task for each individual was a 12 x 8 matrix of ratings, and an example participant=s sentence completion grid for the

mathematics domain can be seen in Figure 1.

		Self							
		.	Unsuccessful Person						
		.	.	Ideal Self					
		.	.	.	Successful Person				
		.	.	.	.	Undesired Self			
		.	.	.	.	.	Friend		
		.	.	.	.	.	.	Self one year from now	
		.	.	.	.	.	.	.	Typical Student Peer
		.	.	.	.	.	.	.	.
	challenged	2	3	-1	3	0	0	0	0 unchallenged
	happy	3	3	3	3	0	1	3	0 sad
	frustrated	-2	1	-3	-3	3	2	-3	0 easy
	satisfied	3	2	3	3	-3	1	0	0 missing something
is not mathematically inclined		-2	3	-3	-2	3	-1	-3	2 a math wiz
	well	3	0	3	2	-3	1	0	0 poorly
	thinker	3	1	3	2	-3	1	3	0 lazy
	good with numbers	3	-1	3	3	-3	2	3	0 bad with numbers
	helpful	3	3	3	3	-3	3	3	1 detrimental
	good	3	3	3	3	-3	2	3	2 bad
	challenging	2	3	3	2	-3	2	3	1 boring
	thought provoking	3	3	3	3	0	2	2	1 easy

Figure 1. *Example sentence completion grid from the mathematics domain. The emergent poles of the constructs (i.e., those elicited first) are listed on the left, and the implicit poles are listed on the right. The ratings could range in value from +3 (emergent pole applies) to -3 (implicit pole applies).*

As stated above, the procedures for the athletics grid were nearly identical to those for the mathematics grid. The only differences were (a) the participants considered individuals who were successful and unsuccessful in athletics, and (b) the participants completed a different set of sentences. With respect to the second difference, the italicized fragments of the mathematics sentences were replaced with words relevant to athletics:

1. While *participating in athletics* I feel _____.
2. Succeeding in *athletics* makes (successful person) feel _____.
3. *Athletics* makes (unsuccessful person) feel _____.
4. While *exercising*, (successful person) feels _____.
5. (Unsuccessful person) does not succeed in *athletics* because he/she _____.
6. Compared to other *activities*, I perform _____ in *athletics*.
7. The one thing that people who succeed in *athletics* have in common is that they are _____.
8. Succeeding in *athletics* requires a person to be _____.
9. Knowing how to succeed in *athletics* is _____.
10. Succeeding in *athletics* makes me feel _____.
11. (Successful person) values *athletics* because *they are* _____.
12. I value/do not value *athletics* because *they are* _____.

As described above, fragments of these sentences were also used to construct the item stems for the rating procedure.

Results

A measure of grid similarity developed by Slater (1972; also, see Grice, 2002b, pp. 65-67) was employed to assess the overall consistency in the ratings for the elements across the two test occasions. This measure requires the element role titles to be the same in the compared grids but does not require identical constructs. It was hence appropriate for the current grids. Slater's index essentially quantifies the degree of similarity between the element correlation matrices (converted to angles in radians) and can loosely be

thought of as an index of similitude between the patterns of elements located in the construct spaces of the two grids. When the patterns of elements are identical the index will equal 1, and when the two patterns are dissimilar the index will be less than or approximately equal to 0. The observed results were generally near 1 for all forty-five pairs of mathematics (M = .82, Mdn = .90, SD = .22) and forty-two pairs of athletics (M = .88, Mdn = .94, SD = .13) grids, indicating impressively high stability in the element ratings across the two test occasions for both domains.

The ratings for the self element in the grids were of particular interest since they could be compared to the self-concept ratings on the SDQ-III. Repertory grid researchers often rely on some type of discrepancy index, such as the Euclidean distance between the self and ideal self, to extract self-relevant information from a grid. Unfortunately, such discrepancy indices have a long history of psychometric difficulties (Cronbach, 1958; Cronbach & Furby, 1970; Edwards, 1994, 1995). We therefore adopted a simple strategy suggested by MacKay (1992) of keying all of the constructs in the same direction based on some criterion; in this instance, the rating of the ideal self on each construct. Specifically, when the ideal self was rated below the midpoint of the scale, the ratings for all of the elements on that particular construct were reflected. If the ideal self was rated at or above the midpoint of the scale, the original ratings were maintained. The constructs were thus aligned in terms of their subjective polarity (positive vs. negative), and the internal consistency of the self ratings could be assessed. An average rating could also be computed for the self in which high values indicated a positive evaluation of oneself and low values indicated a negative evaluation. The validity of the self ratings on the grids could then be assessed by comparing their averages with the SDQ-III subscale scores.

Cronbach's alpha was computed for the aligned self ratings in both the mathematics and athletics grids for each test occasion. The resulting values for the mathematics grids were equal to .89 for both the first and second test occasions, and the corresponding results for the athletics grids were both equal to .86. These values compared favorably to the internal consistencies computed for all participants for the mathematics (alpha = .96 for both occasions) and physical ability (alpha = .94 for both occasions) subscales from the SDQ-III. The coefficient alpha values for the remaining eleven subscales of the SDQ-III for both test occasions were also similar in magnitude (M = .86, Mdn = .89, min = .63, max = .94) to the alpha values for the grids.

The averages of the aligned self ratings across the twelve constructs are summarized in Table 1. As can be seen, the means for the repertory grid ratings were not significantly different across the two test occasions. The means for eleven of the thirteen SDQ-III subscales were also essentially the same for the two test occasions. The mathematics and physical appearance subscales did yield statistically significant (p < .05) increases in scores over time, but the observed effect sizes were very small (~ 2 scale points; d ? .30). The confidence intervals for all measures were fairly narrow, indicating respectable precision in the population parameter estimates.

In terms of test-retest reliability, the participants' average ratings for the self in the mathematics grids were highly consistent, r = .84, as were their average ratings for the self in the athletics grids, r = .81. By way of comparison, the test-retest reliabilities for the SDQ-III mathematics and physical ability subscales for all participants were .94 and .80, respectively. The test-retest reliabilities for the remaining eleven SDQ-III subscales (see Table 1) were generally *lower* than the reliabilities of the grid ratings (M = .75, Mdn = .72, min = .61, max = .86).

Correlations among the average self ratings and SDQ-III subscales for those participants who completed the mathematics grids are reported in Table 2 and can be examined for evidence of convergent and discriminant validity. As can be seen in the first row and first column of Table 2, the validity of the grid self ratings was supported. In terms of convergent evidence, positive self ratings in the mathematics grids were significantly and highly associated with higher self-concept in mathematics for both test occasions (r's > .70). With respect to discriminant validity, the correlations between the grid ratings and the other subscales from the SDQ-III were small (most r's < .15 in absolute magnitude) and nonsignificant for both test occasions.

Table 1. *Test-Retest Correlations, Descriptive Statistics, and Inferential Statistics for Sentence Completion Grid and SDQ-III Measures*

Measure	r_{12}	M_1	M_2	SD_{diff}	t	$p<$	d	CI_{95}
Repertory Grid								
Self (Mathematics)	.84	1.33	1.29	.71	.35	.728	.05	-.18, .25
Self (Athletics)	.81	1.88	1.91	.62	-.29	.616	.05	-.22, .16
SDQ-III								
Mathematics	.94	46.78	48.26	6.55	-2.08	.040	.22	-2.88, -.07
Physical Ability	.80	55.41	55.67	9.64	-.26	.798	.03	-2.33, 1.80
General	.71	76.15	75.76	9.92	.37	.710	.04	-1.73, 2.52
Opposite Sex Peers	.86	58.41	58.36	6.46	.07	.947	.01	-1.34, 1.43
Religion	.76	70.21	70.90	12.12	-.53	.600	.06	-3.29, 1.91
History	.61	73.08	73.40	8.20	-.36	.723	.04	-2.07, 1.44
Verbal	.77	56.10	56.00	7.85	.12	.902	.01	-1.58, 1.79
Emotion	.66	49.40	51.13	10.38	-1.55	.125	.17	-3.96, .49
Parent	.72	59.37	60.23	10.48	-.76	.449	.08	-3.11, 1.39
Academic	.69	58.67	58.45	8.37	.25	.807	.03	-1.57, 2.02
Problem Solving	.80	52.23	53.03	6.77	-1.10	.275	.12	-2.25, .65
Physical Appearance	.84	50.23	52.38	7.28	-2.74	.007	.30	-3.71, -.59
Same Sex Peers	.69	57.15	57.19	7.48	-.04	.966	.00	-1.64, 1.57

Note. r_{12} = one-week test-retest correlation coefficient; M_1 and M_2 = means for first and second test occasions, respectively; SD_{diff} = standard deviation for difference scores. The self ratings from the repertory grids have a possible range of -3 to 3. Most SDQ-III subscales have possible ranges of 10 to 80; the religion, honesty, emotion, and general subscales have possible ranges of 12 to 96. High scores on all measures indicate a more positive self-evaluation.

The correlations for those participants who completed the athletics grids are reported in Table 3. Similar to the results for the mathematics grids, the validity of the self ratings was supported. In terms of convergent evidence, positive self ratings in the athletics grids were significantly and highly associated with higher self-concept in physical ability for both test occasions (r's > .61). In terms of discriminant validity, the correlations between the grid ratings and the other subscales from the SDQ-III were generally small (most r's < .20 in absolute magnitude) and non-significant for both test occasions. A few exceptions were observed (see Table 3); most notably, the athletic grid self ratings were significantly and positively correlated with the physical appearance subscale scores on both test occasions.

STUDY 2

Method

A number of modifications were made to the procedures in Study 1. First, participants were required to complete two smaller sentence completion grids: one for mathematics and one for athletics. Subsets of the twelve original sentences and elements were chosen and entered into smaller grids to reduce the total number of ratings. These changes were made to lower the fatigue that participants may experience while completing two large grids and the 136-item SDQ-III in a single testing session. Second, the sentence completion grids were always presented first to control for the possibility that the participants= elicited constructs or element ratings were affected in some way by their responses to the SDQ-III.

Table 2. *Intercorrelations among Mathematics Sentence Completion Grid and SDQ-III Measures for both Test Occasions*

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Self (Mathematics)	- -	.71**	.05	.09	.10	.16	-.07	-.27	-.01	.08	.26	.21	-.11	-.08
2. Mathematics	.83**	- -	-.09	.04	.03	.06	.17	-.18	-.09	.20	.34	.08	-.20	.07
3. Physical Ability	.08	.04	- -	.19	.66**	.22	.23	.10	.05	.22	.22	.30*	.44**	.24
4. General	.05	-.01	.33*	- -	.54**	.11	.47**	.41**	.57**	.34*	.56**	.32*	.60**	.40**
5. Opposite Sex Peers	.07	.03	.57**	.50**	- -	.17	.43**	.46**	.40**	.39**	.48**	.49**	.49**	.50**
6. Religion	.16	.04	.11	.15	.06	- -	.15	-.10	.06	-.10	.08	.18	-.01	-.06
7. Honesty	-.09	.01	-.14	.39*	.11	-.07	- -	.44**	.28	.39*	.62**	.20	.13	.29
8. Verbal	-.29	-.25	.06	.24	.32*	-.15	.16	- -	.37*	.16	.43**	.39*	.25	.52**
9. Emotion	-.10	-.23	.25	.65**	.53**	.22	.29	.37*	- -	.27	.36*	.19	.27	.25
10. Parent	.12	.13	.17	.19	.37*	-.16	.33*	-.01	.05	- -	.41**	-.01	.20	.15
11. Academic	.24	.24	.28	.60**	.45**	-.05	.29	.45**	.39*	.30	- -	.55**	.23	.31*
12. Problem Solving	.08	.00	.35*	.29	.35*	.15	.06	.51**	.36*	-.14	.54**	- -	.23	.32*
13. Physical Appearance	-.06	-.17	.50**	.75**	.50**	.10	.02	.23	.42**	.24	.45**	.28	- -	.32*
14. Same Sex Peers	-.11	-.17	.26	.35*	.37*	-.05	.02	.33*	.30	.19	.12	.06	.42**	- -

Note. (Self) Mathematics = aligned self ratings from mathematics sentence completion grid. Data for the first test occasion are above the major diagonal, and data for the second test occasion are below the major diagonal of the correlation matrix. High scores for the self indicate more extreme construct ratings in the direction of the ideal self on the scale. High scores on the SDQ-III subscales indicate positive self-regard.

* $p < .05$, ** $p < .001$; two-tailed

Table 3. *Intercorrelations among Athletics Sentence Completion Grid and SDQ-III Measures for both Test Occasions*

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Self (Athletics)	- -	.05	.71**	.18	.25	.09	.09	-.08	.27	.31*	-.06	.09	.35*	.28
2. Mathematics	-.06	- -	-.03	-.16	-.11	.08	-.08	-.40**	.13	.04	.11	.09	-.23	-.15
3. Physical Ability	.62**	-.10	- -	.12	.32*	-.23	-.04	.10	.31*	.36*	-.02	.10	.42**	.23
4. General	.28	-.01	.03	- -	.46**	-.05	.14	.42**	.56**	.12	.32*	.43**	.69**	.30*
5. Opposite Sex Peers	.32*	.02	.26	.56**	- -	-.29	-.20	.31*	.23	.12	.12	.20	.48**	.45**
6. Religion	.08	.10	-.08	.08	-.25	- -	.63**	-.04	-.07	-.02	.15	.09	-.18	-.11
7. Honesty	-.12	.12	-.02	.13	-.24	.60**	- -	.14	.06	.23	.40**	.29	.08	-.11
8. Verbal	.08	-.32*	.07	.50**	.33*	.06	.15	- -	.06	.24	.51**	.33*	.51**	.23
9. Emotion	.13	.24	.10	.61**	.37*	.08	.20	.10	- -	.37*	.06	.15	.37*	.22
10. Parent	.19	.14	.28	.21	.05	.16	.27	.23	.44**	- -	.41**	.26	.21	.31*
11. Academic	-.03	.23	-.02	.47**	.16	.24	.42**	.57**	.31*	.41**	- -	.47**	.36*	.16
12. Problem Solving	.19	-.01	.17	.26	.16	-.02	-.04	.33*	.02	.16	.41**	- -	.44**	-.13
13. Physical Appearance	.33*	-.22	.48**	.59**	.48**	-.09	-.09	.48**	.32*	.17	.39**	.39**	- -	.15
14. Same Sex Peers	.39**	.10	.16	.49**	.60*	.01	.04	.15	.39**	.21	.01	-.10	.20	- -

Note. (Self) Athletics = aligned self ratings from athletics sentence completion grid. Data for the first test occasion are above the major diagonal, and data for the second test occasion are below the major diagonal of the correlation matrix. High scores for the self indicate more extreme construct ratings in the direction of the ideal self on the scale. High scores on the SDQ-III subscales indicate positive self-regard.

* $p < .05$, ** $p < .001$; two-tailed

Table 4. *Intercorrelations among Mathematics and Athletics Sentence Completion Grids and SDQ-III Measures*

Measure	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Self (Mathematics)	.12	.80**	.20	.19	-.05	.23	.02	-.20	.08	.33**	.26*	.25*	.12	.13
2. Self (Athletics)	- -	.11	.80**	.20	.31*	-.01	-.05	-.11	.11	.23	.05	-.01	.18	.16
3. Mathematics		- -	.19	.14	.00	.09	.02	-.20	.15	.26*	.25*	.40**	.18	.07
4. Physical Ability			- -	.20	.35**	.13	.02	-.15	.16	.22	.04	.07	.27*	.19
5. General				- -	.40**	.21	.22	.08	.48**	.43**	.37**	.24*	.63**	.36**
6. Opposite Sex Peers					- -	-.02	.08	.24	.14	.11	.30*	.24*	.54**	.45**
7. Religion						- -	.15	-.09	-.01	.41**	.24*	.03	-.09	-.01
8. Honesty							- -	.48**	.12	.11	.41**	.19	-.13	.31*
9. Verbal								- -	.33**	-.04	.53**	.35**	-.20	.29*
10. Emotion									- -	.35**	.21	.30*	.20	.17
11. Parent										- -	.26*	.16	.17	.31**
12. Academic											- -	.36**	.15	.45**
13. Problem Solving												- -	.20	.20
14. Physical Appearance													- -	.19
15. Same Sex Peers														- -

Note. (Self) Mathematics = aligned self ratings from mathematics sentence completion grid; (Self) Athletics = aligned self ratings from athletics sentence completion grid. High scores for the self indicate more extreme construct ratings in the direction of the ideal self on the scale. High scores on the SDQ-III subscales indicate positive self-regard.

* $p < .05$, ** $p < .001$; two-tailed

Seventy-two undergraduates, 15 men and 55 women (2 individuals did not report their gender), participated in this study in exchange for course credit. The median age of the participants was 19 years (M = 19.6, SD = 4.3), and 75% of the individuals were Caucasian, 14% African American, 1.4% Asian, and 9.6% reported their ethnicity as 'other' or failed to respond.

Each participant completed two sentence completion grids and the SDQ-III. The repertory grids were administered via computer as described above in Study 1, and the SDQ-III was again administered on paper. Thirty-six of the participants, chosen randomly, completed the mathematics grid first, and the remaining participants completed the athletics grid first. The SDQ-III was always administered last. Sentences 1, 2, 3, 5, 7, 8, 9, and 11 were chosen randomly from the complete set of sentences in Study 1 and were used in this study. The "undesired self" and "self 1 year from now" figures were also chosen randomly from the nonessential elements and dropped, resulting in 8 x 6 grids (48 ratings each). Since participants completed two grids, rather than one, these changes reduced the fatigue that would likely set in during the completion of two larger 12 x 8 grids (96 ratings each).

Results

Slater's (1972) index was again used to compare the pattern similarity of the elements (i.e., the rated people) in the mathematics and athletics grids. If the grids successfully tapped two distinct domains of experience, the resulting values should generally be near zero. The observed results ranged from -.72 to .98 across all seventy-two participants and did indicate that the ratings for the two domains were generally, but not completely, distinct (M = .39, Mdn = .45, SD = .46).

The constructs were again keyed in the direction of the ideal self by reflecting the ratings of those constructs on which the ideal self was located below the midpoint of the scale. Coefficient alpha was then computed for each grid and surprisingly revealed increased internal consistency in the smaller grids used in this study. Coefficient alpha for the self ratings in the mathematics grid was .92, and the corresponding alpha in the athletics grid was .86. These values compared very well to the coefficient alphas for the mathematics (.95) and physical ability (.95) subscales of the SDQ-III for this sample. The results for the remaining eleven subscales of the SDQ-III were generally similar in magnitude (M = .84, Mdn = .88, min = .68, max = .94) to the alpha values for the grids.

The correlations among the self ratings and the SDQ-III subscales were computed and examined for evidence of convergent and discriminant validity. As can be seen in Table 4, the results again revealed excellent evidence for the validity of the sentence completion grid ratings. In terms of convergent validity, the correlation between the average self ratings in the mathematics grid and the SDQ-III mathematics subscale was positive and large in magnitude (r = .80, p < .001), as was the correlation between the self ratings in the athletics grid and the physical ability subscale (r = .80, p < .001). With regard to discriminant validity, the self ratings in the mathematics and athletics sentence completion grids were nearly orthogonal (r = .12, p < .340). The mathematics self ratings were also nearly orthogonal to the physical ability subscale of the SDQ-III (r = .20, p < .103), and the athletics self ratings were nearly orthogonal to the mathematics subscale scores (r = .11, p < .386). It can also be seen in the first and second rows of Table 4 that the mathematics and athletics self ratings from the sentence completion grids were not significantly correlated with most of the remaining eleven SDQ-III subscales. The few statistically significant exceptions still revealed small effect sizes and were not replicated from Study 1.

DISCUSSION

Summary of Results

The novel sentence completion grids were found to yield reliable and valid data in both studies reported above. In the first study, the patterns of relationships among all of the elements (i.e., the people who fit specific role titles) in the mathematics and athletics grids were stable over seven day's time. The average ratings for the self, considered in polar relation to the ideal self, were similarly consistent over time in both the mathematics and athletics grids; and the ratings for the self were internally consistent in both types of grids as well. The test-retest and internal consistency reliability estimates ranged from .81 and .92 and would be considered suitable for purposes of con-

ducting basic research. Moreover, the estimates of reliability for the grid data compared favorably to those computed for scores on the Self Description Questionnaire - III (SDQ-III; Marsh, 1989) in the current sample. The SDQ-III is a popular and well established self-report measure of self-concept and served as an appropriate benchmark for the novel sentence completion grids.

The validity of the grid ratings for the self, considered in polar relation to the ideal self, was also supported in the first study. The average self ratings in the mathematics sentence completion grids were found to correlate positively and highly with the mathematics subscale of the SDQ-III, and the average self ratings in the athletics grids were found to correlate positively with the physical ability subscale of the SDQ-III. Correlations between grid ratings in both domains and the remaining SDQ-III subscales were small by comparison, and almost all were not significantly different from zero. The average self ratings in both the mathematics and athletics sentence completion grids hence revealed excellent convergent and discriminant validity based on comparisons with a standard, nomothetic measure of self-concept.

In the first study, each participant completed either a mathematics or athletics sentence completion grid. In the second study, each participant completed both types of grids. Although the grids were smaller, having fewer elements and constructs, the ratings were still found to be reliable and valid. The estimates of internal consistency for the mathematics and athletics self ratings, considered in polar relation to the ideal self, were found to be high and comparable to estimates computed for the SDQ-III subscales. With respect to validity, the overall patterns among the elements in the grids were generally dissimilar across the two types of sentence completion grids. Recall that, while not necessarily identical, several of the people in the grids fit equivalent role titles (e.g., successful and unsuccessful persons) and the self, ideal self, and typical student were constant across both types of grids. Despite these equivalences, the elements rated as similar in the mathematics grids were not necessarily rated as similar in the athletics grids, and elements considered as dissimilar in one grid were not necessarily considered as dissimilar in the other grid. It is as if a different picture of the elements emerged depending on the domain under consideration. Average ratings for the specific self element in the mathematics and athletics sentence completion grids were also found to be nearly orthogonal, as expected on the basis of multidimensional self-concept models. Indeed, the self ratings from the mathematics and athletics grids correlated highly with their corresponding subscale scores of the multidimensional SDQ-III, and were nearly orthogonal to non-corresponding subscale scores.

These initial results for the sentence completion repertory grid are very promising. They are surprising as well, not only because of the newness of the procedure, but also because of its idiographic nature. Each participant essentially created his or her own unique series of rating scales comprised of the responses to the sentence completion task. Furthermore, in the first study, each participant was not required to enter the same responses (constructs) for the first and second testing sessions. A particular individual could therefore create an entirely different set of rating scales for the two test occasions. Despite these sources of variability, however, the overall element ratings and the ratings for the self in both the mathematics and athletics grids demonstrated test-retest reliabilities comparable to those for data from a well established nomothetic scale.

Implications for Idiographic Research

Some authors hold that idiographic approaches produce more meaningful responses because they allow participants to consider ideas, traits, characteristics, etc. they consider to be personally important and most relevant to the task or situation at hand (see Pelham, 1993; Pelham & Swann, 1989). A number of early studies within the realm of personal construct theory indeed showed that participants found rating scales formed from their own constructs to be more meaningful than rating scales formed from bipolar adjectives provided by the examiner (see review by Adams-Weber, 1979). The personal meaningfulness or importance of the constructs elicited and used by the participants in the two current studies could not be assessed directly, but examination of the constructs themselves revealed some interesting examples of the unique information that emerged from the sentence completion task. For instance, one student from Study 2 elicited the following constructs in the mathematics domain: *irritated vs. overjoyed, intelligent vs. stupid, inadequate vs. gifted, does not understand it vs. knows the material, methodological think-*

ers vs. daydreamers, regimented in their thinking vs. creative thinkers, a talent vs. a learned skill, and *important vs. inconsequential*. Compare these constructs with those from another participant shown in Figure 1, and a sense of the individual variability involved in the sentence completion grid emerges. Whether or not the unique aspects of each person's personal constructs and grids offer information above-and-beyond a traditional nomothetic measure such as the SDQ-III, however, is a question that remains unanswered at this point. The correlations between the self ratings in the grids and the corresponding SDQ-III subscales were positive, relatively high, and statistically significant, but the proportion of overlap between the measures never exceeded 70%. It would hence be worthwhile to compare the predictive power of the sentence completion grid to a nomothetic questionnaire regarding some relevant dependent variable, such as body image or class performance.

In addition to its idiographic nature, the sentence completion grid possesses a number of attractive features. For instance, virtually any domain of experience that can be assessed via simple self-report methods can also be assessed with the sentence completion grid. Sentences could easily be written for the remaining eleven dimensions of Marsh's hierarchical model of self-concept and the six factors of Bracken's multi-faceted model. Given the flexibility of the sentence completion task, a large number of sentences could easily be written for any of these domains. Moreover, the sentences could be written to be more narrowly focused than in the current studies. For example, self-concept in the domain of statistics could be assessed and correlated with performance in an undergraduate statistics class which most students experience as very different from a typical course in mathematics. Marsh and Redmayne (1994) argued that physical self-concept has a multidimensional, hierarchical nature, which suggests that the focus of at least some of the SDQ-III subscales may be refined further. In other words, the SDQ-III or other measures of self-concept may not be narrow or specific enough to provide adequate predictive power for some domains of experience. The sentence completion grid may not suffer from this limitation. On the other end of the spectrum, sentences with a wide focus could be constructed; for example, "Overall, I am the type of person who is _____", or "Generally speaking, I really wish I was more _____." These sentences would yield grid ratings relevant to one's general self-concept, and a large number of such sentences could easily be constructed.

If sentence completion grids can be constructed at different levels of abstraction, then a hierarchical model of self-concept could be tested. For instance, mathematics, athletics, and general sentence completion grids could be administered to the same individuals. The ratings for the self in the grids could then be compared as described above. Based on Marsh's (1989, 1990) model, one would expect small correlations between the self ratings in the specific and general grids. Indeed, the SDQ-III general self-concept subscale scores in the two studies reported above were nearly orthogonal to the average self ratings in the mathematics and athletics grids. It also seems conceivable to test models of self-discrepancy using the current methods. Self-discrepancies are those discrepancies between a person's 'actual self' and some alternative or idealized self such as the 'feared-self', 'future-self', 'ideal-self', or 'ought-self'. Higgin's (1987; Higgins, Klein, & Strauman, 1985) self-discrepancy theory posits that different self-discrepancies are predictive of different emotional states. For instance, discrepancies between the actual and ideal selves are predictive of depression, whereas discrepancies between the actual and ought selves are predictive of anxiety. In most studies of self-discrepancy, the various selves are measured generally. By using the sentence completion grid and including different selves in the constructed sentences and rating procedures, self-discrepancies could be measured in particular domains. Discrepancies between all pairs of elements (people) in the grid could also be examined, as is commonly done in studies of semantic space (e.g., Hart, et al., 1993). As was shown in the second study above, the snapshot of the semantic space obtained from the grid ratings changed considerably depending on the domain the individuals were considering, mathematics or athletics. It seems plausible that such differences across domains are the rule rather than the exception. Placing a person in context when assessing his or her semantic space would therefore be an important consideration in study design.

Caveats and Future Research

Certainly, additional studies of the sentence completion grid's psychometric properties must accompany or precede these potential avenues of research. Only two domains of experience were examined in the two studies reported herein, and only one set of sentences was constructed and examined. Additional sentences relevant to the domains of mathematics and athletics should be constructed and assessed in an attempt to replicate the current findings. The relationships among elements (i.e., the people) across two grids in the same domain but based on different sets of sentences should also be examined. Based on the proposition that the sentences are essentially sampled from a homogeneous domain, one would expect that the results above would replicate with new sentences and that constructing two sets of sentences for, say mathematics, would yield equivalent patterns of relationships among the elements. The issue of grid size (i.e., the number of elements and number of constructs) also deserves further attention. Would the results above hold for grids with twice the number of constructs or elements? Recall that the self ratings in the grids from the second study above were more internally consistent than the larger grids in the first study. Would this counterintuitive effect replicate in an independent study, and would the trend continue such that as the grids include more constructs or elements, the internal consistency of the ratings decreases? Most of the element role titles were identical (e.g., 'self', 'friend') in the mathematics and athletics grids, but some were only nearly equivalent (e.g., 'unsuccessful person in math' and 'unsuccessful person in athletics'). Could these differences alone account for the changes in element patterns between the two grids? A study that includes identical elements rated in both domains would help to address this question. Issues of scaling must also be explored. Most notably, in the current studies the midpoint of the seven-point rating scale was labeled as 'uncertain or does not apply', which apparently includes two distinct alternatives. This approach for dealing with the midpoint may not be optimal, and other strategies (e.g., providing a separate 'does not apply' option) could be employed and compared. The results from such psychometric studies would be informative not only for the sentence completion methodology described herein, but also for research that incorporates any type of repertory grid technique.

Finally, from the perspective of Personal Construct Theory, a number of important questions must be addressed. For example, what types of constructs are being elicited from the sentence completion task? Core constructs are those an individual uses to maintain his or her identity. Eliciting such constructs would seem to be necessary for obtaining a valid assessment of an individual's sense of self. Role constructs are those bipolar dimensions of discrimination formed from an attempt to understand a particular person's outlook or the views of a large group. If the topic domain of the sentence completion task is a role relationship (e.g., a marriage), are role constructs, or perhaps even core role constructs, elicited? Obviously, the sentence completion grid is new, and a great deal of basic research is yet to be done to explore its limitations and its potential. Nonetheless, the initial results from the two studies above are promising, and we are therefore hopeful that the current paper will stimulate additional research on the sentence completion grid and lead to additional developments for assessing individual's personal constructs in different domains of experience.

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ABOUT THE AUTHORS

James W. Grice, Ph.D., is an assistant professor of psychology in the department of psychology at Okla-

homa State University where he teaches courses on statistical methodology. His is most interested in multivariate statistics and their application to problems in mainstream personality psychology. He has been a student of Personal Construct Theory since the 1980s and has authored scientific papers and computer programs relevant to repertory grid methodology. E-mail: jgrice@okstate.edu

Edward and *Melissa Burkley* are currently enrolled in the social psychology doctoral program at the University of North Carolina Chapel Hill.

Sara Wright is completing her postdoctoral studies in neuropsychology at the University of Iowa Hospitals and Clinics, Center for Disabilities and Development.

Jennifer Slaby is a psychologist in Nevada, Missouri, who earned her Master's degree in general psychology from Southern Illinois University Edwardsville.

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