

## Development of a measure of relationship perception in schizophrenia

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### Abstract

Relationships Across Domains (RAD) is a new measure of competence in relationship perception that may be used to assess clinically stable persons with schizophrenia and healthy persons. The structure and content of the RAD are grounded in relational models theory, a well-validated theory of social relations. The 75-item RAD contains 25 vignettes and can be administered in approximately 35 min. The RAD requires participants to implicitly identify the relational model of a dyad described in a brief vignette and infer how the members of the dyad are likely to behave in three other social contexts. The RAD demonstrated good internal consistency in schizophrenia outpatients and healthy participants matched to the outpatients in age and education. The schizophrenia outpatients performed more poorly on the RAD than two healthy comparison groups, supporting the ability of the RAD to discriminate between clinical and non-clinical populations. The schizophrenia patients' performance on the RAD was moderately related to reading ability and several domains of community functioning.

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### 1. Introduction

Social cognition, the ability to construct mental representations about others, oneself, and relations between others and oneself (Adolphs, 2001; Brothers, 1990), is impaired in persons with schizophrenia (Green et al., 2005). Relative to healthy persons, schizophrenia

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patients display impairments in social cognitive domains such as emotion processing (Archer et al., 1994; Pollard et al., 1995), social perception (Corrigan and Green, 1993; Toomey et al., 2002), theory of mind (Greig et al., 2004; Roncone et al., 2002), and social knowledge (Corrigan and Addis, 1995; Penn et al., 2002). Correlational and structural equation modeling analyses strongly suggest that social cognition mediates relations between neurocognition and community functioning in schizophrenia (e.g., Addington et al., 2006; Brekke et al., 2005; Sergi et al., 2006; Vauth et al., 2004). The investigators of the NIMH Initiative Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) identified social cognition as one of seven domains that should be routinely assessed in clinical trial studies of schizophrenia (Green et al., 2004).

Relationship perception, an important aspect of social cognition, has not been studied in schizophrenia largely due to the absence of a measure of competence in relationship perception. Most measures of social cognition assess how persons understand and make inferences about other individuals, typically by perceiving social cues such as facial expressions or gestures. However, social relationships also depend on relationship perception — the ability to implicitly recognize the model that others are using to organize a given social interaction, and to understand the implications of using that particular relational model. Findings of impaired relationship perception in schizophrenia would advance our understanding of social cognition in schizophrenia and likely explain variance in the functional status of persons with schizophrenia that is not explained by other aspects of social cognition. Hence, we developed a measure of competence in relationship perception that assesses one's capacity to implicitly recognize and make appropriate inferences about relational models.

Relational models theory is a well-validated and widely applied theory of relationship perception (Fiske, 1991, 2004). It posits that people construct, coordinate, and evaluate their social relationships using four implicit relational models (see Table 1). Communal sharing relationships are based on the sense that participants have something socially significant in common — usually something that differentiates them from others. Communal sharing relationships vary in intensity from deep love to team membership to community citizenship to ethnic or national identities. Authority ranking relationships are linear hierarchies of prestige and legitimate authority, such as military seniority, corporate position, or, especially in traditional societies, age. In equality matching relationships, people keep track of additive differences in what they give and get, with reference to

Table 1  
The four relational models

Communal sharing	<ul style="list-style-type: none"> <li>• Members are equivalent and undifferentiated</li> <li>• Members focus on commonality among persons in the relationship</li> <li>• Members share resources without accounting</li> <li>• Seen in healthy family and love relationships</li> </ul>
Authority ranking	<ul style="list-style-type: none"> <li>• Members focus on asymmetric hierarchical ordering</li> <li>• “Decision maker” takes initiative and accepts responsibility</li> <li>• “Follower” readily accepts and supports the decisions of the “decision maker”</li> <li>• Seen in relations between military personnel and medical personnel of different rank</li> </ul>
Equality matching	<ul style="list-style-type: none"> <li>• Members focus on one-to-one correspondence regarding contributions and distributions</li> <li>• Members closely monitor effort and/or resource use and evaluate against a 50:50 baseline</li> <li>• Reciprocity of like behaviors amongst members</li> <li>• Seen in turn-taking among peers, car pools, and baby-sitting cooperatives</li> </ul>
Market pricing	<ul style="list-style-type: none"> <li>• Members focus on proportionality</li> <li>• Each member is entitled to a “fair rate of return” proportional to their contribution</li> <li>• Relationships are organized by ratios and rates such as wages and cost-benefit calculations</li> <li>• Seen in buyers and sellers, but need not involve money</li> </ul>

even balance. Examples include balanced, in-kind reciprocity such as exchanging party invitations; turn-taking; voting; and the rules of nearly all sports and games. Market pricing relationships are organized with reference to some socially meaningful ratio or rate, such as prices, wages, rents, taxes, interest. But relationships based on *rationality* need not involve money or even material barter; market pricing operates in cost/benefit analysis, military analysis based on kill-ratios, utilitarian moral reasoning, and standards of proportional justice (e.g., calculating just rewards or due punishments).

According to relational models theory, the four relational models govern social behavior across the many domains of social life (e.g., material transactions, distributions, contributions, organization of work, meaning of places and things, social decision-making, moral judgment, normative aggression) (Fiske, 1991). Persons in any given group or dyadic relationship may use different relational models in different situations. For example, although Mary acts as Joe's boss in the office (characteristic of the authority ranking relational model), they may play tennis after work as equals (characteristic of the equality matching relational model). However, a given dyad typically has a default or preferred model that they tend to use to coordinate most of their interactions (Haslam and Fiske, 1999).

Considerable evidence suggests that the relational models correspond to persons' implicit organization of relationships. The relational models organize memory for acquaintances (e.g., recall of acquaintances tends to be organized by the relational model most characteristic of the relationship with the acquaintance) (Fiske, 1995). The relational models also account for both intentional and inadvertent substitutions of people in naming, memory, and action (e.g., attempting to telephone Ben, you actually dial Mike because most of your interactions with both Ben and Mike are communal sharing experiences) (Fiske, 1995; Fiske et al., 1991; Fiske and Haslam, 1997). Taxometric studies support the theory's contention that the relational models are discrete categories (Haslam, 1994), and cross-cultural research indicates that the relational models are present in diverse societies (Fiske, 1990, 1993).

Inflexible or aberrant use of the relational models is connected to vulnerability to depression, bipolar disorder, psychosis, and personality disorders (Allen et al., 2005; Haslam, 2004; Haslam et al., 2002). While people typically perceive their family relations as based primarily on communal sharing and authority ranking, vulnerability to dysthymia is correlated with unusually extreme perceptions of communal sharing and authority ranking in family relations (Allen et al., 2005). Hypomania is associated with higher than average perceptions of communal sharing and authority ranking in close friendships, and atypically high perceptions of communal sharing and equality matching in relationships that most people perceive as hierarchical. Psychosis proneness is associated with low perceptions of communal sharing and equality matching, along with high perceptions of authority ranking (Allen et al., 2005). Most personality disorders are associated with a unique pattern of motivation to engage in, frequency of engagement in, and reported frustration in different relational models. For example, in both non-clinical and clinical samples, schizoid PD is associated with low investment in communal sharing relationships, low implementation (or construal) of equality matching relationships, and lack of reported difficulties in relationships organized according to any type of relational model (Haslam et al., 2002; Haslam, 2004).

However, these studies of psychopathology and nearly all previous quantitative research on relational models theory have been limited to studying how people perceive their relationships, their motivations or preferences for each relational model, or their difficulties with each relational model. No previous research has explored *competence* in using relational models. Competence may vary across individuals — and since people use relational

models to generate, comprehend, coordinate, and evaluate their relationships, deficient competence is likely to significantly impact social functioning and, more generally, subjective and objective well being. Hence, we developed the RAD (*Relationships Across Domains*), the first measure of competence in recognizing the four relational models and making inferences from one interaction to others.

The first step in creating a measure of competence in relationship perception and inference was to generate a pool of sentences describing social interactions between varied male–female dyads. The originator of relational models theory, Dr. Alan Fiske, assessed the construct validity of each sentence. Each social interaction was consistent with one of the four relational models and a specific domain of social life. Preferred sentences were used to create test items (see Materials and methods section and Table 2 for more details regarding test items).

Table 2  
Sample items from Relationships Across Domains (RAD)

I. Information about Alan and Patty

Alan and Patty buy gifts for each other whenever they see something they think the other would like, just because they like to make each other happy. They recently had to decide where to locate their restaurant. Alan and Patty thought about how each potential location would affect their relationship with each other. They picked a site that they thought would allow them to spend the most time together.

Alan and Patty in other situations

Using what you now know about this pair, circle yes or no to indicate whether the pair would act or think in the way described in each of the following statements.

1. Alan keeps track of the time he spends with Patty relative to the time he spends with other people. (Yes) (No)
2. Patty brings home all the money she earns and turns it over to Alan; whenever she needs spending money, she asks Alan and he gives her some. (Yes) (No)
3. Alan and Patty feel like they've always been together, and always will be. (Yes) (No)

II. Information about Jerry and Karen

Karen often thinks about whether her association with Jerry is a good use of her time. Jerry and Karen recently had to decide where to locate their office. Jerry got a cost estimate for the location he wanted and Karen got a cost estimate for the location she wanted. They selected the location with the lowest costs.

Jerry and Karen in other situations

Using what you now know about this pair, circle “yes” or “no” to indicate whether the pair would act or think in the way described in each of the following statements.

4. Karen is careful not to interrupt Jerry when he is speaking, but he interrupts her sometimes. (Yes) (No)
5. Jerry and Karen had to make an important decision yesterday. They made offers and counter offers to each other, and then signed a contract that states what each of them needs to do. (Yes) (No)
6. Jerry won an award earlier this year. Karen figured that Jerry had earned it and that Jerry's tremendous investment of time and energy had finally paid off. (Yes) (No)

Table 3  
Comparison of the three groups

	Undergraduates	Schizophrenia patients	Healthy comparison	<i>t</i> -test UG/SZ		<i>t</i> -test SZ/HC	
	( <i>n</i> = 140)	( <i>n</i> = 48)	( <i>n</i> = 34)	<i>t</i>	<i>P</i>	<i>t</i>	<i>P</i>
Gender (male: female)	37: 103	30: 18	23: 11				
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)				
Age (years)	19.2 (1.6)	33.9 (7.7)	32.1 (5.2)				
Education (years)	12.9 (1.0)	14.0 (1.6)	14.0 (1.5)				
SAPS (mean global rating)		1.0 (0.8)					
SANS (mean global rating)		1.8 (1.0)					
WTAR <sup>a</sup> (percent correct)		76.6 (18.6)	85.0 (13.3)			2.11	<0.05
RAD (percent correct)							
Total score	74.7 (7.7)	68.3 (9.3)	77.6 (7.3)	4.78	<0.001	4.83	<0.001
CS — vignette	84.4 (10.7)	76.9 (13.7)	86.6 (7.5)	3.89	<0.001	3.76	<0.001
AR — vignette	80.0 (10.8)	70.3 (14.5)	80.0 (14.9)	4.93	<0.001	2.96	<0.005
EM — vignette	65.9 (11.3)	59.3 (12.3)	69.1 (9.8)	3.45	<0.005	3.89	<0.001
MP — vignette	63.5 (13.2)	65.6 (12.8)	69.8 (13.1)	−0.95	NS	1.47	NS
CS — statement	71.8 (10.2)	66.3 (10.8)	74.6 (12.4)	3.16	<0.005	3.21	<0.005
AR — statement	79.0 (11.0)	73.7 (15.1)	85.7 (9.6)	2.61	<0.01	4.06	<0.001
EM — statement	84.2 (11.6)	74.0 (14.6)	80.3 (11.8)	4.03	<0.001	2.07	<0.05
MP — statement	61.8 (12.7)	57.6 (11.6)	62.8 (11.7)	2.03	<0.05	2.01	<0.05
RFS <sup>b</sup>							
Work productivity		3.1 (1.8)					
Independent living		4.9 (1.4)					
Family relationships		5.8 (1.2)					
Social relationships		4.5 (1.8)					

All *t*-tests were two-tailed.

SZ, schizophrenia outpatients; UG, undergraduates; HC, healthy comparison participants; SAPS, Scale for the Assessment of Positive Symptoms; SANS, Scale for the Assessment of Negative Symptoms; RAD, Relationships Across Domains; CS, Communal Sharing; AR, Authority Ranking; EM, Equality Matching; MP, Market Pricing; WTAR, Wechsler Test of Adult Reading; RFS, Role Functioning Scale.

<sup>a</sup> 45 schizophrenia outpatients and 29 healthy comparison participants completed the WTAR.

<sup>b</sup> 46 schizophrenia outpatients completed the RFS.

The “beta version” of Relationships Across Domains (RAD) consisted of 40 vignettes with three questions per vignette, a total of 120 questions. This draft was administered to 109 undergraduates with the intention of “pruning” items to increase internal consistency. The 25 vignettes with the highest average item-total correlations were retained, yielding a 75 question measure with adequate internal consistency ( $\alpha=0.78$ ).

The present article reports on the psychometric properties and discriminative validity of the 25-vignette/75-item RAD. Our first aim was to assess the internal consistency of the RAD in three samples: outpatients with schizophrenia; healthy persons similar to the outpatients in age, education, and gender; and undergraduate students. A second aim was to establish that the RAD could detect different levels of competence in relationship perception between schizophrenia outpatients and healthy persons. As persons with schizophrenia show impairment on most measures of social cognition, we hypothesized that the outpatients would perform less well on the RAD than both comparison groups. The third aim was to examine the relationship

between performance on the RAD and reading skill (an estimate of premorbid verbal intelligence). As the RAD involves written vignettes, we hypothesized that the RAD and the Wechsler Test of Adult Reading would be somewhat correlated in schizophrenia outpatients and healthy persons. The fourth aim was to examine the relationship between performance on the RAD and community functioning. As relational models theory argues that social functioning depends on an implicit understanding of the relational models, we hypothesized that performance on the RAD and performance on the Role Functioning Scale would be correlated in schizophrenia outpatients.

## 2. Materials and methods

### 2.1. Participants

The present study involved three groups of participants: 48 schizophrenia outpatients, 34 healthy comparison participants who were similar to the outpatients in age and education, and 140 undergraduate students. This

study was carried out in accordance with the Declaration of Helsinki. All persons participated in the study after providing their written informed consent. The students participated in the study to satisfy a requirement of a lower division psychology course. They were informed of alternatives for meeting the requirement, such as writing a paper. The students had to have seven years of English-based education to participate in the study. The schizophrenia outpatients and the healthy comparison participants were part of a larger study of multiple aspects of social cognition in schizophrenia titled “Social Cognition: Interpersonal and Emotional Processes” (M. F. Green, Project P.I.) within the UCLA Center for Neurocognition and Emotion in Schizophrenia (K. H. Nuechterlein, Center P.I.). All outpatients met criteria for schizophrenia based on interview with the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID; First et al., 1997). All potential healthy control participants were administered the SCID and selected sections of the Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II; First et al., 1996). Potential healthy comparison participants were excluded if they had a history of any psychotic disorder, recurrent depression, bipolar disorder, substance dependence, or if they met criteria for any of the following personality disorders: Avoidant, Paranoid, Schizoid, and Schizotypal. Potential control participants were also excluded if they had a first-degree relative with a psychotic disorder. The psychiatric symptoms of the outpatients were assessed with the Scale for the Assessment of Positive Symptoms (SAPS; Andreasen, 1986) and the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1984; Andreasen and Grove, 1986). These measures contain anchored items that are rated from 0 (symptom absent) to 5 (symptom severe). SAPS and SANS raters, trained to use these measures in the UCLA Center for Neurocognition and Emotion in Schizophrenia, demonstrated agreement between their ratings and the consensus ratings of the expert diagnosticians (minimum intraclass coefficient=0.75). The SAPS and SANS ratings (Table 3) indicate that the outpatients’ symptoms were mild at the time of their participation. The age, education, and gender distribution of the participants are displayed in Table 3. The outpatients and the healthy comparison participants did not differ in age,  $t(80)=1.14$ ,  $P=0.26$ , or education,  $t(80)=0.12$ ,  $P=0.90$ . The majority female undergraduate sample reflects the gender distribution of those enrolled in lower division psychology courses at California State University, Northridge (CSUN).

The study protocol for the undergraduate students was approved by the human subjects protection committee of CSUN. The study protocol for the schizophrenia patients and the healthy control participants was approved by the

human subjects protection committee of UCLA. The human subjects protection committees of both UCLA and CSUN approved the publication of the respective data sets in a single report.

## 2.2. Procedures

The undergraduate students completed the RAD in groups of 4 to 12 participants. The schizophrenia outpatients and the healthy comparison participants completed the RAD and Wechsler Test of Adult Reading individually. The outpatients with schizophrenia completed the Role Functioning Scale individually. All participants were asked to read the RAD silently as the tester read it aloud.

## 2.3. Measures

### 2.3.1. Relationship perception

Relationships Across Domains (RAD) is a 75-item paper and pencil measure of competence in relationship perception. The content and format of the RAD are based on relational models theory (Fiske, 1991, 2004). The content of the RAD’s vignettes and items reflects the theory’s contention that four relational models (communal sharing, authority ranking, equality matching, market pricing; see Table 1) govern social behavior across many domains of social life (e.g., material transactions, distributions, contributions, organization of work, meaning of things, social decision-making, moral judgment). The RAD reflects the theory’s assertion that persons use their implicit knowledge of the four relational models to understand social relationships and make inferences about the behavior of social partners in future interactions.

The RAD contains 25 two- to four-sentence vignettes, each involving a differently named male–female dyad whose interpersonal behaviors are consistent with one of the four relational models (see Table 2). Each vignette is followed by three statements that describe the dyad’s interpersonal behavior in domains of social life different from that of the vignette. Each of the three statements is consistent with one of the relational models. The order of relational models of the vignettes was varied throughout the RAD so that practice or fatigue effects during administration would not affect performance on items of any one relational model. Participants are asked to use what they learned about the dyad from the vignette to indicate whether the behaviors described in the three statements are likely or unlikely to occur by answering “yes” or “no.” Thus, participants use their implicit knowledge of the relational models to correctly answer the items of the RAD. The number of items per vignette



with correct “yes” responses (range 0–3) was intentionally varied to reduce response expectations in participants. Of the 25 vignettes of the RAD, eight involve communal sharing content, six involve authority ranking content, six involve equality matching content, and five involve market pricing content. Of the 75 items of the RAD, 25 involve a communal sharing statement, 25 involve an authority ranking statement, 14 involve an equality matching statement, and 11 involve a market pricing statement. The total number of correct responses on the measure provides an index of competence in relationship perception. The reading level of the RAD was estimated at the ninth grade using the Flesch–Kincaid algorithm of Microsoft Word. Administration of the RAD typically required about 35 min for participants in all groups.

### 2.3.2. Reading ability

The Wechsler Test of Adult Reading (WTAR; Psychological Corporation, 2001) is a measure of reading ability that is often used as an estimate of premorbid intellectual ability in persons with cognitively impairing disorders. Participants are asked to read aloud 50 phonetically irregular words of increasing difficulty. Reading ability is estimated by the number of words correctly pronounced. Administration of the WTAR required about 3 min. The WTAR was administered only to the schizophrenia outpatients and the matched comparison participants.

### 2.3.3. Psychosocial status

The Role Functioning Scale (RFS; McPheeters, 1984) measures four domains of functioning in everyday life: work productivity, independent living/self-care, relationships with family and spouse, and relationships with friends. Each domain is rated on specific anchor points ranging from 1 (severely limited functioning) to 7 (optimal functioning). The RFS has sound psychometric properties (Goodman et al., 1993) and has been widely used in service outcome studies in schizophrenia (e.g., Brekke et al., 1997; Brekke and Long, 2000; Green and Gracely, 1987). Interviewers for the RFS were masters and doctoral level persons, who were trained in the Functional Outcomes Core of the UCLA Center for Neurocognitive and Emotion in Schizophrenia (John Brekke, Ph.D. Core Director). The RFS was rated after a 30- to 45-min semi-structured interview with each schizophrenia patient.

## 2.4. Data analyses

The internal consistency of the RAD was estimated with Cronbach's (1951)  $\alpha$ . Independent samples

$t$ -tests and ANCOVAs were employed to examine group differences between the schizophrenia outpatients and the comparison participants on the RAD and WTAR. Pearson  $r$  coefficients were calculated to assess the relationship between the RAD, the WTAR, and the RFS for select groups.

## 3. Results

The RAD demonstrated good internal consistency for the schizophrenia outpatients ( $\alpha = .85$ ) and matched comparison participants ( $\alpha = .86$ ), and somewhat lower internal consistency for the undergraduate students ( $\alpha = 0.68$ ).

Performance on the Wechsler Test of Adult Reading (WTAR) is displayed in Table 3. The schizophrenia outpatients performed more poorly than the healthy control participants on the WTAR,  $t(72) = 2.11$ ,  $P < 0.05$ . As anticipated, performance on the RAD (total score) was related to performance on the WTAR in the schizophrenia outpatients,  $r(45) = 0.49$ ,  $P < 0.01$ . However, performance on the RAD (total score) was not related to performance on the WTAR in the healthy comparison participants,  $r(29) = 0.19$ ,  $P = 0.33$ .

Performance on the RAD for each group is displayed in Table 3. The schizophrenia outpatients performed more poorly on the RAD (total score) than both the healthy comparison participants,  $t(80) = 4.83$ ,  $P < 0.001$ , and the undergraduate students,  $t(193) = 4.78$ ,  $P < 0.001$ . The difference between outpatients and healthy comparison subjects on the RAD remained significant when the effects of reading ability (WTAR) were accounted for,  $F(1, 77) = 5.33$ ,  $P < 0.05$ . To examine group differences in understanding of individual relational models, statements (items) were identified as belonging to a specific relational model in two ways: by the relational model of the vignette preceding the statement or by the relational model of the statement itself. In general, the schizophrenia outpatients performed significantly more poorly than the healthy comparison participants and the undergraduates on the four relational models, identified by vignette or statement. Only market pricing identified by vignette did not evidence group differences.

Performance on the Role Functioning Scale is displayed in Table 3. The performance of the schizophrenia patients on the RAD (total score) was related to independent living/self-care,  $r(45) = 0.34$ ,  $P < 0.05$ , relationships with family and spouse,  $r(45) = 0.36$ ,  $P < 0.05$ , relationships with friends,  $r(45) = 0.31$ ,  $P < 0.05$ , but not to work productivity,  $r(45) = 0.12$ ,  $P = 0.44$ . When the influence of reading ability/premorbidity intellectual ability (WTAR) was statistically controlled, the patients'

performance on the RAD (total score) continued to be associated with independent living/self-care,  $r(39) = 0.33$ ,  $P < 0.05$ , and relationships with family and spouse,  $r(39) = 0.40$ ,  $P < 0.05$ .

Performance on the RAD was not associated with age in any of the samples (schizophrenia patients,  $r(47) = -0.21$ ,  $P = 0.16$ ; healthy comparison participants,  $r(34) = -0.20$ ,  $P = 0.26$ ; undergraduate students,  $r(144) = -0.12$ ,  $P = 0.14$ ). Gender differences in performance on the RAD were not observed in any sample (schizophrenia patients,  $t(45) = -1.15$ ,  $P = 0.26$ ; healthy comparison participants,  $t(32) = -0.20$ ,  $P = 0.84$ ; undergraduate students,  $t(138) = -0.77$ ,  $P = 0.44$ ). Performance on the RAD was related to the schizophrenia patients' positive symptoms (RAD and total of the global ratings on the SAPS,  $r(47) = -0.36$ ,  $P < 0.05$ ), but not their negative symptoms (RAD and total of the global ratings on the SANS,  $r(47) = -0.27$ ,  $P = 0.07$ ).

#### 4. Discussion

Relationships Across Domains (RAD) is a new measure of relationship perception that is appropriate for use with clinically stable persons with schizophrenia and healthy persons. The RAD demonstrated good internal consistency in schizophrenia outpatients and matched comparison participants. The internal consistency of the measure was somewhat lower in university undergraduates. The RAD detected differences in relationship perception between the schizophrenia outpatients and the two healthy samples, showing that the patients were impaired in their overall competence in relationship perception as well as their understanding of the individual relational models. The RAD's associations with family relations, friend relations, and independent living/self-care support the relationship between competence in relationship perception and community functioning in schizophrenia.

In general, the schizophrenia outpatients performed significantly more poorly than the healthy comparison participants and the undergraduates on the four relational models, identified by vignette or statement. Only market pricing identified by vignette did not evidence group differences. The lack of a group difference in market pricing is not consistent with relational model theory's contention that market pricing is the last relational model to develop in persons. The most likely explanation is psychometric: market pricing vignettes were fewer in number than the vignettes of the other relational models; affording for lesser statistical power and likely resulting in the observed lack of group differences. Another possibility is that the writing of the market pricing

vignettes made them difficult to comprehend for all participants. Contrary to this argument, the percent correct for market pricing vignettes – averaged across all groups – were actually greater than the percent correct for equality matching vignettes.

The relationship perception skill of the schizophrenia patients was related to independent living/self-care, relationships with family and spouse, and relationships with friends, but not to work productivity. The associations observed support the link between social cognition and functional status in schizophrenia. Relationship perception, the ability to understand and make inferences about relations between others, appears to impact the schizophrenia patient's ability to get along with friends and family. While relationship perception did not correlate with work productivity, largely assessed by days and hours of paid or volunteer work, the findings suggest that relationship perception may impact the patient's ability to get along with employers and co-workers — a skill that is essential for maintaining employment.

The development of the content of the RAD occurred through our close collaboration with an expert in relational models theory (Dr. Alan Fiske). For this reason, we consider it to have acceptable content validity. Our close collaboration with Dr. Fiske also affected the structure of the RAD. Performance on the RAD requires an implicit appreciation of the relational models and anticipation of the social actions of persons based on their past social behaviors, reflecting the theory's contention that persons use their implicit knowledge of the relational models to understand and evaluate social relationships, to generate their own social action, and to anticipate the actions of others.

One limitation of the RAD is that it is somewhat language-dependent. Performance on the WTAR, an estimate of reading ability and premorbid verbal intelligence, was related to performance on the RAD in the patient sample. This association with verbal ability will need to be considered when the RAD is used with chronic psychiatric patients. However, the RAD revealed differences in relationship perception between schizophrenia outpatients and healthy comparison participants even when reading ability was controlled statistically. Importantly, two of the three associations between the RAD and aspects of community functioning remained significant even when reading ability was controlled statistically.

The RAD was developed to complement the measures of social cognition currently used to study schizophrenia and other mental disorders. Whereas other measures of social cognition assess person perception (e.g., emotion recognition from facial expressions), the RAD assesses

implicit relationship recognition and inference. The development of the RAD stems from a collaboration between basic social scientists and clinical researchers, working together to try to identify the determinants of functional outcome in schizophrenia patients. In the next phase of this program, we will more extensively assess the ecological validity of the RAD and other measures of social cognition in schizophrenia patients across different stages of the illness.

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