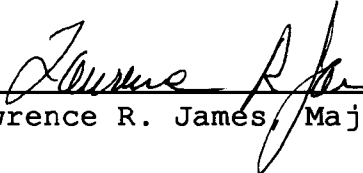
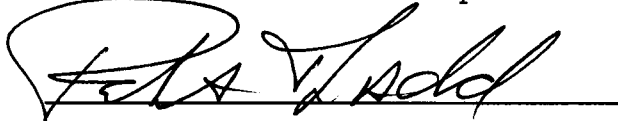


To the Graduate Council:

I am submitting herewith a dissertation written by Michael D. McIntyre entitled "A Feasibility Study of a Conditional Reasoning Measure of Aggressiveness and Prosociality." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Industrial/Organizational Psychology.


Lawrence R. James, Major Professor

We have read this dissertation
and recommend its acceptance:







Accepted for the Council:


Associate Vice Chancellor
and Dean of the Graduate School

A FEASIBILITY STUDY OF A CONDITIONAL REASONING
MEASURE OF AGGRESSIVENESS AND PROSOCIABILITY

A Dissertation
Presented for the
Doctor of Philosophy
Degree
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Michael D. McIntyre

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ABSTRACT

The feasibility of a conditional reasoning measure of aggressiveness and prosociability was tested on patrol officers (N=144) employed by a large, Southeastern utility company. Eight of the fourteen conditional reasoning problems written for this administration had correlations with various performance criteria that were both significant and in the predicted direction. Specifically, aggressive solutions to conditional reasoning problems were negatively correlated with patrol officer activity (e.g., arrests, investigations), supervisor performance ratings, and supervisor rankings. In contrast, prosocial solutions to these same conditional reasoning problems were positively correlated with the criteria. These results suggest that the aggressive solutions were predictive of low or poor performance and perhaps indirect or passive aggressive behavior. Content analysis suggested that the problems designed to elicit aggressive individuals' hostile attribution biases were the most predictive.

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SECTION I

INTRODUCTION

There are some people who harbor a great deal of anger, hostility, and resentment toward the rest of the world. These people are predisposed to perceive themselves as victims of mistreatment, abuse, exploitation, and oppression, and tend to be suspicious of other people's motives and intentions. These people tend to be wary and distrustful of strangers, and are predisposed to evaluate new people in terms of their potential as adversaries or opponents. The behavior of these people is often motivated by a need to seek retribution or exact vengeance for their perceived mistreatment. Their anger, hostility, and resentment are often manifested in antisocial or harmful behavior. Specifically, these people are likely to engage in behavior that is argumentative, oppositional, antagonistic, caustic, stubborn, or uncooperative. The personality profile described above is commonly referred to as an aggressive personality (Baron, 1977; Berkowitz, 1986; Buss & Perry, 1992; Caprara & Pastorelli, 1989; Dodge & Frame, 1982; Felson & Tedeschi, 1993; Huesmann, 1987; Rosenzweig, 1965; Toch, 1969). Individuals with personalities that closely match this profile may be considered to have an aggressive, antisocial personality disorder.

In contrast, the majority of the people in the world do not harbor extreme anger and hostility, do not view themselves as victims of mistreatment, abuse, and oppression, and are not motivated by a need to seek retribution or exact vengeance. Most people have a more positive and optimistic outlook on life and on their relationships with other people. While they may be competitive, ambitious, and achievement motivated, these people do not operate from a framework that makes aggressive, antisocial behavior a common behavioral choice. Most people conform to social norms regarding interpersonal behavior. Consistent with many personality theorists (Buss & Perry, 1992; Eisenberg & Miller, 1987; Knight, Johnson, Carlo, & Eisenberg, 1994), the majority of people can be thought of as possessing prosocial personalities.

The purpose of this study is to investigate the feasibility of a new measure of aggressiveness and prosociability. This new measure is based on the principle of conditional reasoning (James, 1995), an overview of which is provided in the next section of this paper. Following this overview is a description of the application of conditional reasoning to the measurement of aggressiveness and prosociability.

Conditional Reasoning

Conditional reasoning refers to the process whereby individuals' latent motives influence their attempts to solve certain types of inductive reasoning problems. Conditional reasoning is conceived of as a three-stage process in which individuals (1) evaluate or interpret the information presented within a problem; (2) develop or construct a causal model pertaining to the information presented within the problem; and (3) identify a logical solution to the problem. Before discussing the role of latent motives in the conditional reasoning process, let me first describe the context or type of problem in which conditional reasoning is most likely to occur.

Conditional reasoning is most likely to occur when individuals are faced with the task of identifying a logical solution to an inductive reasoning problem that is both informal and evocative. By "informal", it is meant that the problem requires individuals to make an inference (a) based on incomplete information; (b) when there is a lack of established rules and criteria for objectively judging the information; and (c) when multiple ostensibly "logical" but incompatible solutions to the problem exist (cf. Galotti, 1989; Kuhn, 1991; Wagner & Sternberg, 1985, 1986). By "evocative", it is meant that the problem has sufficient personal relevance to the reasoner that it stimulates or elicits the latent motives of the reasoner. The key point,

then, is that conditional reasoning is most likely to occur when individuals attempt to derive a logical solution to a problem that (a) has multiple possible but conflicting answers and (b) stimulates the latent motives of the reasoner.

To illustrate the various stages involved in the conditional reasoning process and the role of latent motives in each stage, an informal, evocative problem is presented. Consider the following:

The quality of American cars has increased dramatically in the last 15 years. The move toward better quality started about the time that American car makers began to lose market share to foreign car makers, especially the Japanese. American buyers regarded foreign automobiles as more reliable and better constructed. What does this history of events suggest?

The first stage in the conditional reasoning process involves individuals evaluating or interpreting the information presented within the problem. Important to conditional reasoning is the fact that individuals with different latent motives are likely to evaluate or interpret the same information differently. This phenomenon is referred to as "differential framing" and is defined as the process whereby individuals with different latent motives

attach qualitatively different meanings to the same set of information within a problem.

For example, in the problem above, individuals might differentially frame the information about American car makers. Aggressive people are predisposed to feeling resentful and suspicious of others, especially powerful others whom they view as likely sources of mistreatment and exploitation. Subsequently, aggressive people are likely to view American car makers as unscrupulous and untrustworthy companies, and they are likely to frame the information presented in the problem from the perspective of American car makers exploiting consumers. Aggressive people are likely to frame the information from the perspective of why American car makers built unreliable cars in the years preceding foreign competition.

In contrast, prosocial people do not harbor extreme resentment toward powerful others and are more likely to appreciate the accomplishments of powerful others. Subsequently, prosocial people are likely to view American car makers as respectable and important companies, and they are likely to frame the information presented in the problem from the perspective of American car makers successfully competing with foreign car makers. Prosocial people are likely to frame the information from the perspective of how well American car makers were able to respond to foreign competition. The key point is that individuals' latent

motives may lead to different interpretations of the information presented within an informal, evocative problem.

The next stage in the conditional reasoning process involves individuals constructing a causal model pertaining to the information presented in the problem. Having attached a personal meaning to the information within the problem, individuals are likely to construct an implicit causal model pertaining to that information. Consider the problem above. Aggressive people are likely to have framed the information from the perspective of American car makers exploiting customers. Consistent with this framing, aggressive people are likely to construct a causal model that attributes American car makers' production of unreliable cars to exploitative motives on the part of American car makers. That is, aggressive people are likely to link the unreliability of American cars to American car makers taking advantage of consumers and making an excessively large profit.

In contrast, prosocial people are likely to have framed the information in the problem from the perspective of American car makers successfully competing with foreign car makers. Consistent with this framing, prosocial people are likely to develop a causal model that attributes American car makers' success to adaptability and improvement on the part of American car makers. That is, prosocial people are likely to link American car makers' success to their ability to

respond effectively to competition. The key point here is that individuals' differential framing of the information presented within an informal, evocative problem may lead to the construction of different, implicit causal models pertaining to that information.

The final stage in the conditional reasoning process involves individuals attempting to identify a logical solution to the problem. Fundamental to conditional reasoning is the notion that individuals will identify as logical a solution that is consistent or compatible with the implicit causal model they have constructed for the information in the problem. Individuals will identify as logical a solution that agrees with, strengthens, or confirms the causal model they have constructed.

In regard to the problem above, aggressive individuals are likely to identify as logical a solution that is consistent with a causal model attributing the low quality of American cars to exploitative motives on the part of American car makers. Aggressive individuals are likely to identify as logical a solution that confirms the notion of American car makers as exploitative. Conversely, prosocial individuals are likely to identify as logical a solution that is consistent with a causal model attributing American car makers' success to the ingenuity of American car makers.

The case has been made that individuals' latent motives influence their framing of information within an informal,

evocative problem and influences the implicit causal model they construct pertaining to this information. Moreover, it has been proposed that individuals are likely to identify as logical a solution to an informal, evocative problem that is consistent or compatible with the causal model they construct. From these suppositions, it can be concluded that individuals' latent motives indirectly influence which solution to an informal, evocative problem that they identify as logical. It is this link between individuals' latent motives and the solutions they identify as logical that serves as the foundation for the conditional reasoning measurement system.

The Measurement System

The objective of the present measurement system is to assess the strength of each individual's aggressiveness and prosociability by discerning the types of solutions to informal, evocative problems that the individual views as logical. Conditional reasoning serves as the basis for the system because the types of solutions that an individual consistently views as logical reveal the individual's latent motives. The solutions that an individual consistently views as logical can be used as an indirect means to gauge the underlying strength of the latent motives of the individual. In this case, the tendency to identify as logical the solutions that are compatible with aggressive motives is

considered an indication of aggressiveness. In contrast, the tendency to identify as logical the solutions that are compatible with prosocial motives is considered an indication of prosociability.

The informal, evocative problems developed using the conditional reasoning measurement system are referred to as conditional reasoning (CR) problems. CR problems are designed to look like the inductive reasoning questions found on many standardized tests (e.g., SAT, LSAT). Each CR problem contains a paragraph of information followed by five possible solutions. Respondents must identify the most logical solution to the problem. One of the solutions is designed to be compatible with latent motives toward aggressiveness and thus to appear logical to aggressive respondents. Another solution is designed to be compatible with latent motives toward prosociability and thus to appear logical to prosocial respondents. The three other solutions are distracters that are designed to appear illogical to all respondents.

In the example above, the solution designed to appear logical to aggressive respondents is the following: "Prior to the introduction of high quality cars from foreign car makers, American car makers purposely built cars to wear out so they could make a lot of money selling replacement parts." This solution casts American car makers in a negative light and is compatible with aggressive individuals' framing of

American car makers as unscrupulous and untrustworthy companies. The solution designed to appear logical to prosocial respondents is the following: "American car makers have learned how to build better quality cars in the last 15 years." This solution casts American car makers in a positive light and is compatible with prosocial individuals' framing of American car makers as respectable and important companies.

In summary, the intent of each CR problem is that aggressive and prosocial individuals will identify as logical the solution that is designed for them, i.e., that is compatible with their latent motives. Answers to CR problems will then furnish an indirect assessment of a propensity to reason in a way that is characteristic of aggressive or prosocial individuals.

Attributions Regarding Other's Behavior

CR problems were constructed around two basic themes that were thought to elicit differential framing on the part of aggressive and prosocial individuals. The first theme concerned attributions that aggressive and prosocial individuals make for other people's ambiguous behavior. Aggressive individuals are prone to experience a hostile attribution bias (Dodge & Frame, 1982; Dodge & Coie, 1987). That is, based on their suspicion and distrust of others, aggressive individuals are likely to impute malevolent intent

to the actions of others. In contrast, prosocial individuals are not likely to make similar hostile attributions.

The problem presented earlier is an example of a CR problem designed to elicit differential framing of other people's ambiguous behavior. It was hypothesized that aggressive individuals would be distrustful of American car makers and thus identify as logical a solution that portrays them as exploitative and underhanded (i.e., that incorporates a hostile attribution bias). In contrast, it was hypothesized that prosocial individuals would be respectful of American car makers and thus identify as logical a solution that commends their ability to respond to foreign competition.

A second CR problem constructed around this theme describes a scenario in which a new female student at a high school is paying close attention to another female student to whom she is very similar in style and appearance. Specifically, the new girl is checking out who the other girl's friends are, whom she appears to dislike and avoid, and how she acts around boys. Respondents are required to make an inference about the new girl's behavior.

Aggressive individuals are expected to frame the new girl's behavior as an indication of her impending encroachment on the other girl's territory. Therefore, it is hypothesized that aggressive individuals will identify as logical a solution that portrays the new girl in an

adversarial light and incorporates the hostile attribution bias: "The new girl is checking out the other girl as a likely rival."

In contrast, prosocial individuals are expected to frame the new girl's behavior as an indication of her admiration and interest in becoming friends. Therefore, it is hypothesized that prosocial individuals will identify as logical a solution that associates a positive outcome with the new girl's behavior: "The two girls may become friends."

Attitudes toward Aggressive Behavior

A second theme around which CR problems were constructed concerned attitudes toward aggressive behavior. Aggressive individuals are likely to view aggressive behavior as appropriate and effective behavior in many circumstances (Felson & Tedeschi, 1993). That is, based on their predisposition to view themselves as victims of mistreatment, abuse, and oppression, aggressive individuals are likely to view aggressive behavior as an appropriate response and a necessary means of self-defense or retribution. In contrast, prosocial individuals are more likely to frame aggressive behavior as inappropriate, unnecessary, and counterproductive in most circumstances.

An example of a CR problem designed to elicit differential framing in regard to aggressive behavior is the following:

Newspapers and television recently described a rather wealthy neighborhood in New York that was terrorized for years by a homeless man. This man slept in alleys, was constantly drunk or high on drugs, harassed residents on a daily basis by shouting obscenities, and threatened to hurt many of the residents. The man never actually hurt a resident. The police were called many times, but the homeless man got legal help and was always allowed to return to the neighborhood and wreak havoc. What is most likely to be true about the residents of this neighborhood based on the information above.

Aggressive individuals were expected to frame the residents as victims of harassment and to frame this situation as one requiring aggressive behavior on the part of residents. Therefore, it was hypothesized that aggressive respondents would identify as logical a solution that degrades the residents for not engaging in aggressive behavior: "The residents were afraid of the man, and would not confront him to show their unhappiness."

In contrast, prosocial individuals were expected to frame this situation as one requiring patience and restraint on the part of the residents. Therefore, it was hypothesized that prosocial individuals would identify as logical a

solution that supports the residents' failure to resort to aggressive behavior: "The residents did all that they could do within the laws of the land."

A second CR problem constructed around this theme describes a scenario in which a young child hits another child in an attempt to gain control of a toy, but in so doing loses the other child as a playmate. The child then returns the toy and regains the other child's company. Respondents are required to infer what the child who did the hitting has learned.

Aggressive individuals are expected to frame hitting as an effective and appropriate means of gaining control of the toy. Therefore, it is hypothesized that aggressive individuals will identify as logical a solution that associates positive outcomes with hitting: "The child can control other children by hitting them."

In contrast, prosocial individuals are expected to frame hitting as a counterproductive approach to maintaining interpersonal relationships. Therefore, it is hypothesized that prosocial individuals will identify as logical a solution that associates an aversive outcome with hitting: "Hitting other children hurts them and results in the loss of a friend and playmate."

Summary

CR problems have been constructed around two primary themes that are thought to elicit differential framing among aggressive and prosocial individuals: attributions of other people's ambiguous behavior, and attitudes toward aggressive behavior. It is expected that aggressive individuals will identify as logical the solutions to CR problems that impute malevolent intent to other people's behavior and that portray aggressive behavior as appropriate and effective. In contrast, it is expected that prosocial individuals will identify as logical the solutions that cast a more positive light on other people's behavior and that portray aggressive behavior as inappropriate and counterproductive.

SECTION II

METHODS

In essence, each individual CR problem represents a test of a hypothesis. For each problem, there is a predicted pattern of responses -- that is, there is one solution that should appeal logically to aggressive individuals and one solution that should appeal logically to prosocial individuals. Empirical tests of these hypotheses require demonstrating that individuals who select aggressive (or prosocial) solutions are significantly more likely than those who do not to manifest aggressive (or prosocial) behavior.

In this study, aggressive and prosocial behaviors were examined in the context of patrol officer job performance. It was expected that aggressive patrol officers would manifest their distrust and discontentment toward their employer and co-workers by engaging in direct and indirect aggressive behaviors such as habitual tardiness, unauthorized absences, chronic complaining, insubordination, malingering, and being obstreperous. Such behaviors would contribute to low or poor job performance on the part of patrol officers. Consequently, in this study, it was predicted that aggressiveness would be related to low or poor job performance.

Prosocial patrol officers, on the other hand, are likely to have a strong work ethic, to believe that one should get along with other people, and to comply with legitimate authority. It was expected that prosocial patrol officers would arrive at work punctually, seldom be absent, be respectful of supervisors and co-workers, and abide by the rules and regulations of the organization. Such behaviors would contribute to high performance on the part of patrol officers. Consequently, in this study, it was predicted that prosociability would be related to high job performance.

To summarize, it was hypothesized that aggressive solutions to CR problems would be negatively correlated with patrol officer performance, while prosocial solutions to CR problems would be positively correlated with performance. This pattern of results would indicate support for the theories underlying the construction of the CR problems.

Subjects

Subjects were patrol officers employed by a large, Southeastern utility company in 15 locations across the Southeastern United States. Patrol officers were in charge of law enforcement on property owned and operated by the utility company (e.g., public use areas, campgrounds, lakes).

At the time of this study, the company was involved in creating and selecting a new police officer position. Incumbent patrol officers were informed that they were

required to take and pass a battery of selection tests in order to be hired into the new officer position. Incumbent patrol officers were also given the option of early retirement. Of the 180 incumbent patrol officers, 36 opted for early retirement.

The 144 incumbent patrol officers who chose to apply for the new officer position served as the subjects in this study. Mean subject age was 41 years ($SD = 7.1$; range = 23 to 58). Ninety-two percent of the subjects were male. Eighty-nine percent of the subjects were white; nine percent were black. The mean tenure of the subjects with the company was 98 months ($SD = 78$; range = 0 to 240). Ninety-four percent of the subjects had high school diplomas; forty-three percent had 2- or 4-year college degrees.

Administration

Data for this study were collected as part of the larger selection test battery. The entire test battery took 5 hours to complete and was administered at one of four utility company sites by a proctor who was employed by the company. Administration took place in groups of 4-8, and patrol officers were given time off from work to participate in the testing.

Measures

Scores on the Conditional Reasoning Test (CRT) served as the predictor variable in this study. The version of the CRT used in this study is a 32-problem instrument presented to subjects as a test of inferential skills. The CRT contained 14 newly developed problems designed to measure aggressiveness and prosociability. Each problem on the CRT presents subjects with a paragraph of information and five possible solutions (1 aggression solution, 1 prosocial solution, and 3 illogical solutions). Subjects are instructed to choose the one solution that can be most reasonably inferred from the paragraph. Subjects were given 1 hour to complete the CRT.

Criterion variables in this study included activity reports and supervisors' ratings and rankings of patrol officer performance. Activity reports for each patrol officer were provided by supervisors, and included information on five patrol officer activities over the last 12 months: number of arrests made, number of citations issued, number of warnings made, number of investigations conducted, and number of assists performed. A rate of activity was computed for each variable by dividing each of the 5 activities by the number of weeks that the patrol officer worked over the last 12 months. Analyses were conducted on the activity rate variables. In an effort to maximize reliability on the activity rate variables, a total

activity rate variable was computed by summing the 5 activity rate variables ($\alpha=.60$). A MANOVA indicated significant differences in mean activity rates across the 15 work locations ($p<.01$). These differences were interpreted as reflecting differences in opportunity for activity across locations rather than differences in performance due to motivation (i.e., aggressiveness and prosociability). Thus, to control for differences in opportunity, each of the activity variables was standardized within location for subsequent analyses.

Performance ratings for each patrol officer were provided by supervisors. Five-point likert scales ranging from 1=not at all effective to 5=extremely effective were used to rate patrol officers on seven dimensions of performance that had been identified by subject matter experts (e.g., patrol officers and supervisors) through a strategic job analysis as critical to the success of patrol officers. Each of the 7 dimensions contained 5 items. Communication items ($\alpha=.91$) concerned oral and written expression as well as listening skills. Interpersonal Skill items ($\alpha=.93$) concerned rapport and relationships with co-workers. Judgment and Decision Making items ($\alpha=.94$) concerned appropriateness and timeliness of decisions. High Performance items ($\alpha=.93$) concerned innovativeness and follow through on commitments. Assertiveness items ($\alpha=.94$) concerned investigations and interaction with

public. Reliability items ($\alpha=.93$) concerned adherence to standard operating procedures. Professional Demeanor items ($\alpha=.94$) concerned management of stressful situations.

An overall score was computed on each performance dimension by summing the individual item ratings. A MANOVA indicated significant differences in mean performance ratings across the 15 work locations ($p<.01$). These differences were interpreted as reflecting differences in supervisors' rating schemas or standards of reference for rating rather than differences in performance due to motivation (i.e., aggressiveness and prosociability). Thus, to control for differences in supervisors' rating schemas, the 7 rating variables were standardized within location for subsequent analyses.

Work location (sector) rankings and district rankings for each patrol officer were provided by supervisors. Sector rankings were made by individual sector supervisors, while district rankings were a consensus decision on the part of sector supervisors from within the same district. Sector and district rankings were standardized to account for uneven numbers of patrol officers across areas.

SECTION III

ANALYSES AND RESULTS

The first step in the analysis was to examine the distribution of responses (solutions chosen) on each of the CRT problems. To reiterate briefly, each CR problem was designed to have one aggressive solution and one prosocial solution (along with 3 distracter solutions). The distribution on a CR problem generally consisted of the proportion of subjects selecting the aggressive solution versus the proportion of subjects selecting the prosocial solution (i.e., the p-values of the two solutions). A conservative, minimum level of variation was deemed necessary in order to retain a problem for subsequent statistical analyses. It was decided that the aggressive solution and the prosocial solution had to have p-values between .05 and .95 in order for a problem to be retained. Examination of p-values for solution frequencies indicated that 12 of the original 14 problems met the minimum variation requirement. The 2 problems that failed to meet the minimum variation requirement contained prosocial solutions with p-values greater than .95.

The next step in the analysis involved examining the relationship between individual CR problem solutions and the various criteria. Biserial correlations were computed

between the dichotomous CRT solutions of the 12 retained problems and the continuous criterion variables. The biserial correlation was used because it yields the most accurate estimate of the relationship between a dichotomous variable and a continuous variable when p-values diverge from .50 (Lord & Novick, 1968).

The biserial correlation analysis on the 12 retained problems yielded the following results: 8 of the problems contained solutions that correlated with multiple criteria both at a significant level ($p < .05$) and in the predicted direction; 2 of the problems contained solutions that had nonsignificant correlations with the criteria; and 2 of the problems contained solutions that correlated significantly with multiple criteria but in the direction opposite of that predicted. These latter 4 problems were excluded from further analysis.

The correlations of the 8 CR problems that were both significant and in the predicted direction are displayed in Table 1. Inspection of Table 1 reveals that 14 of the 16 solutions were significantly correlated with at least one activity report criterion. Selection of aggressive solutions was associated with low levels of activity (arrests, citations, etc.), whereas selection of prosocial solutions was associated with high levels of activity.

The correlations in Table 1 also reveal that all 16 solutions were significantly correlated with at least one

Table 1: Significant biserial correlations between conditional reasoning solutions and criteria.

Solution (p-value)	Activity Report Data							Supervisor Rating					Supervisor Ranking		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 PS (76)	18	18	18					27		24	18		17		
1 Ag (22)				-17				-26		-22					
2 Ag (06)	-28	-19		-38			-17		-24	-27	-24	-18	-20	-28	-37
2 PS (92)				30					27	28	17			23	29
3 Ag (08)	-23				-23	-19				-23				-33	-45
3 PS (88)	27	18			20	25					19			42	49
4 Ag (12)			-30		-36	-22	-39	-29			-19	-19	-30	-23	-26
4 PS (87)			30		36	22	39	29			19	19	30	23	26
5 PS (42)		22								19					
5 Ag (56)		-20		-17						-21	-18	-18			-18
6 PS (92)			-17		-30		37	23	33	32	41	32	32	41	53
6 Ag (07)			17		30		-37	-23	-33	-32	-41	-32	-32	-41	-53
7 Ag (80)			-17			-19			-17						
7 PS (08)		21	23			24	20		24	19	21				
8 Ag (15)										-19		-20	-17		
8 PS (78)									18	23		25	21		

Note: N=141. A correlation of .17 is significant at the .05 level.

Activity Report Data	Supervisor Ratings	Supervisor Rankings
1. Arrests	7. Communication	14. Sector Ranking
2. Citations	8. Interpersonal Skill	15. District Ranking
3. Warnings	9. Judgment	
4. Investigations	10. High Performance	
5. Assists	11. Assertiveness	
6. Total Activity	12. Reliability	
	13. Demeanor	

supervisor-rated dimension of performance. Again, consistent with predictions, selection of aggressive solutions was associated with low performance ratings, whereas selection of prosocial solutions was associated with high performance ratings.

Inspection of Table 1 reveals that the correlations with supervisor rankings were fewer in number but larger in magnitude than correlations with activity report data and performance ratings. The pattern of correlations with rankings was similar to that of activity report data and performance ratings in that selection of aggressive solutions was associated with lower rankings, while selection of prosocial solutions was associated with higher rankings.

Taken as a whole, the correlational results strongly support the hypothesized relationships between CR problem solutions and job performance criteria. It was predicted that aggressive solutions would be negatively related to job performance, whereas prosocial solutions would be positively related to job performance. Over half of the 24 CR problem solutions written for this study yielded correlations with multiple criteria that were both significant and in the predicted direction. Moreover, a third of the newly written CR problem solutions yielded correlations greater than .30, and 2 solutions yielded correlations greater than .50.

Solution Intercorrelations

The next step in the analysis involved examining the relationships among the aggressive and prosocial solutions. The intercorrelations among the 16 CR problem solutions are presented in Table 2. Inspection of Table 2 reveals that the intercorrelations among the aggressive solutions vary in terms of magnitude and direction. Moreover, the pattern of intercorrelations among the prosocial solutions is the mirror image of those among the aggressive solutions. This similarity in patterns reflects the fact that, for nearly every individual CR problem, the aggressive solution had a perfect negative correlation with the prosocial solution. That is, if the respondent selected the aggressive solution, he or she did not select the prosocial solution, and vice versa.

One explanation for the variation in magnitude and direction of the intercorrelations within each set of solutions (aggressive and prosocial) is the extreme sensitivity of biserial correlations to widely divergent p-values. Consider the case where 15 of 140 respondents select the aggressive solution to one CR problem, and a different 15 of 140 respondents select the aggressive solution to a second CR problem. In this case, the fact that the 15 respondents who selected one aggressive solution did not select the other aggressive solution could lead to a negative biserial correlation between the two aggressive solutions.

Table 2: Intercorrelations among conditional reasoning solutions.

	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
	Ag	Ag	Ag	Ag	Ag	Ag	Ag	Ag	PS	PS	PS	PS	PS	PS	PS
1 Ag															
2 Ag	04														
3 Ag	-90	11													
4 Ag	-22	03	14												
5 Ag	11	44	14	-28											
6 Ag	17	45	08	24	-02										
7 Ag	08	87	-38	-01	-02	87									
8 Ag	-19	-05	21	44	01	32	11								
1 PS		-03	91	24	-08	-15	-10	21							
2 PS	01		-08	01	-29	-42	-87	09	-02						
3 PS	38	-30		-06	-15	-26	28	-12	-39	26					
4 PS	22	-03	-14		28	-24	01	-44	-24	-01	06				
5 PS	-10	-43	-13	29		03	00	01	06	28	14	-29			
6 PS	-17	-45	-08	-24	02		-87	-32	15	42	26	24	-03		
7 PS	-89	-80	29	20	-09	80		-86	89	80	-22	-20	10	80	
8 PS	05	-07	-22	-30	04	35	11		-07	03	12	30	02	35	88

Note: N=141.

A second explanation for the variation in magnitude and direction of the intercorrelations within each set of solutions is the presence of multiple factors underlying each set of solutions. To investigate this possibility, a principal components analysis of the aggressive solutions was conducted. A varimax rotation yielded the factor structure presented in Table 3. A principal components analysis of the prosocial solutions yielded a virtually identical factor structure.

Factor One, comprised of problems 2, 6, and 7, appears to capture the anger, resentment, and contempt that aggressive individuals feel toward big companies. Problem 2 requires an inference regarding store owners' use of customer profiles to identify likely shoplifters. The aggressive solution to this problem asserts that store owners are likely to use profiles as an excuse to harass people they don't like. Problem 6, the American car maker problem described earlier, requires an inference regarding the increase in quality of American cars. The aggressive solution to this problem asserts that American car makers were intentionally producing a low quality product before the onset of foreign competition. Problem 7 requires an inference regarding the cost-cutting measures of an airline and the accident record of the airline. The aggressive solution to this problem asserts that the cost-cutting measures were directly related to accidents involving the airline. The aggressive solution

Table 3: Principal components analysis of aggressive solutions.

Solution	Factor 1	Factor 2	Factor 3
1	.10	-.89	-.17
2	.89	.14	-.31
3	-.04	.99	.03
4	.10	.20	.77
5	.28	.25	-.68
6	.84	-.06	.35
7	.96	-.24	.08
8	.21	.28	.61
Variance	2.55	2.03	1.67
Explained			

in each of these three problems allows respondents to vent their suspicion and resentment of big companies and to denounce big companies for mistreating consumers, i.e., falsely accusing them of shoplifting, selling them shoddy products, and endangering their lives.

Factor Two, comprised of problems 1 and 3, appears to capture the wariness and suspicion with which aggressive individuals view close attention from another party. Problem 1 requires an inference regarding a new high school student's close attention to another student. The aggressive solution to this problem interprets the close attention as a sign that the new student is a likely rival for the old student. Problem 3 requires an inference regarding the implementation of a tightly controlled management system, employee productivity, and employee violence. The aggressive solution to this problem interprets the tightly controlled management system as intended to humiliate and exploit employees.

The negative relationship between the aggressive solutions in problems 1 and 3 may stem from the fact that one solution involves direct aggression and the other involves indirect aggression (Buss, 1961). The solution to problem 1 involves a student directly rivaling another student, whereas the solution to problem 3 involves management indirectly humiliating employees through tighter controls. The negative relationship between these two solutions indicates that the respondents who identified the direct aggression solution as

logical were not the same respondents who identified the indirect aggression solution as logical.

Factor Three, comprised of problems 4, 5, and 8, appears to capture aggressive individuals' need to defend themselves in the face of perceived provocation by another party. Problem 4 requires an inference regarding the behavior of armed robbery victims and the likelihood of assault. The aggressive solution to this problem depicts an armed robber being violent despite the cooperation of the victim. Problem 5, the homeless man problem described earlier, requires an inference regarding residents' reaction to being harassed. The aggressive solution to this problem depicts the residents as unhappy and afraid of the homeless man. Problem 8 requires an inference regarding the decline in labor union membership over the last 20 years. The aggressive solution to this problem implies that companies are taking advantage of workers who have failed to organize into labor unions.

Similar to the situation in Factor 2, the negative relationship between the aggressive solutions in problems 4 and 5 may stem from the fact that one solution involves direct aggression and the other involves indirect aggression. (Problem 8 is omitted from this discussion because of its nonsignificant correlation with problem 5.) The aggressive solution in problem 4 describes armed robbers directly harming victims. The aggressive solution in problem 5 describes neighborhood residents indirectly confronting a

homeless man by calling on the police. The negative relationship between these two solutions indicates that the respondents who identified the direct aggression solution as logical were not the same respondents who identified the indirect aggression solution as logical.

In summary, a principal components analysis suggests that there are multiple themes underlying each set of solutions (aggressive and prosocial). One possible interpretation of the observed factor structure reveals the following three themes: aggressive individuals' resentment and contempt toward big companies; aggressive individuals' wariness and suspicion of close attention from other parties; and aggressive individuals' need to defend themselves in the face of perceived provocation by another party.

Criterion Intercorrelations

The next step in the analysis involved examining the relationships among the various criteria. The intercorrelations among the various criterion variables are presented in Table 4. The upper left triangle of Table 4 displays the intercorrelations among the activity report variables. These correlations tended to be fairly modest, with the exception of total activity and warnings (.79) and total activity and assists (.63).

The lower right triangle of Table 4 displays the intercorrelations among the supervisor performance ratings,

Table 4: Intercorrelations among criteria.

Criterion	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Arrests														
2 Citations	34													
3 Warnings	18	40												
4 Investigations	20	12	26											
5 Assists	17	13	37	12										
6 Total Activity	32	43	79	30	63									
7 Communication	12	13	13	04	03	11								
8 Interpersonal Skills	04	-05	-01	-02	-04	01	60							
9 High Performance	23	10	-02	01	-03	03	57	73						
10 Judgment	19	18	04	-04	-01	10	71	62	69					
11 Assertiveness	42	32	16	04	10	26	43	46	66	60				
12 Reliability	16	-07	-06	-15	07	07	43	42	45	41	40			
13 Demeanor	05	02	01	-04	-05	02	58	79	63	59	44	42		
14 Sector Ranking	30	22	04	07	-01	14	63	61	71	66	74	44	68	
15 District Ranking	32	23	04	08	05	16	59	57	68	63	73	41	62	92

Note: N ranges from 138 to 144. A correlation of .17 is significant at the .05 level.

which ranged from .40 to .79. The magnitude of these correlations suggests substantial consistency in supervisors' ratings across different dimensions of performance. This consistency could be a function of halo on the part of supervisors (Landy & Farr, 1980). The correlations between the activity report variables and the supervisor performance ratings are displayed in the middle block of Table 4. These correlations tended to be nonsignificant, although ratings of assertiveness correlated .42 with number of arrests and .32 with number of citations. These findings suggest that arrests and warnings were particularly salient to supervisors in their ratings of assertiveness, while other areas of patrol officer activity were not salient to supervisors in their ratings of performance. In general, it appears that supervisors' ratings of performance were based largely on something other than patrol officer activity.

Sector and district rankings had moderately high correlations with number of arrests and citations, ranging from .22 to .32. These results suggest that patrol officer activity in these areas influenced supervisors' rankings of patrol officers. Sector and district rankings had extremely high correlations with supervisor ratings of performance, ranging from .41 to .74. The magnitude of these correlations suggests substantial consistency between supervisor ratings and supervisor rankings. Overall, it appears that supervisors used the same information in making both rankings

and ratings, and that this information tended to be something other than patrol officer activity. It may be the case that supervisors based their ratings and rankings of patrol officers on their personal interaction with patrol officers rather than on patrol officer activity in the field.

Supervisors may consider their personal interaction with patrol officers to be more important than patrol officer activity in the field. Alternately, supervisors may consider their personal interaction with patrol officers to be an accurate reflection of patrol officer activity in the field. Finally, their personal interaction with patrol officers simply may be more accessible (i.e., easier to recall) for supervisors than patrol officer activity in the field.

Composites

The final step in the analysis involved grouping CR problem solutions into composites in an effort to improve prediction of the various criteria. Separate prosocial and aggressive solution composites were derived for each criterion by combining all the solutions that had significant correlations in the predicted direction with the criterion. A resultant composite was derived by subtracting the aggressive composite from the prosocial composite. The (Pearson) correlations between each of the three composites (prosocial, aggressive, and resultant) and the criteria were computed. The results of this analysis are presented in

Table 5. Solution composites had correlations of .30 or higher with six of the fifteen criteria. Solution composites, like individual solutions, generally had higher correlations with supervisor ratings and rankings than with activity report data.

Table 5: Composite validities.

Criterion	Prosocial Composite	Aggressive Composite	Resultant Composite
Arrests	.20	-.20	.20
Citations	.25	-.24	.25
Warnings	.27	-.25	.27
Investigations	.14	-.18	.16
Assists	.29	-.29	.29
Total Activity	.26	-.23	.26
Communication	.29	-.23	.27
Interpersonal Skills	.31	-.30	.31
Judgment	.24	-.22	.24
High Performance	.33	-.30	.32
Assertiveness	.32	-.30	.31
Reliability	.25	-.26	.26
Demeanor	.30	-.29	.30
Sector Ranking	.30	-.28	.29
District Ranking	.35	-.36	.36

SECTION IV

DISCUSSION

This study represents an initial test of the feasibility of a conditional reasoning measure of aggressiveness and prosociability. Results of both problem-level and composite-level analyses suggest that conditional reasoning is indeed a feasible approach to the measurement of these personality types. At the problem level, 12 of the 14 problems written for this administration demonstrated adequate within-problem variation. That is, 12 of the 14 problems contained both an aggressive solution that was selected by at least five percent of the respondents and a prosocial solution that was selected by no more than ninety-five percent of the respondents.

The results also tended to confirm the pattern of predicted responses, with 8 of the 14 problems containing solutions that had correlations with criteria that were both significant and in the predicted direction. Selection of the aggressive solutions was correlated with low or poor performance, while selection of the prosocial solutions was correlated with high performance. The aggressive solutions were negatively correlated with activity report data (e.g., rate of arrests, warnings, and citations). This relationship suggests that the aggressive solutions tended to predict

inactivity on the part of patrol officers, which could be considered a form of indirect or passive aggressive behavior (Buss, 1961; Pulkinnen, 1987). One might infer from these findings that patrol officers with latent aggressive dispositions were more likely to manifest their aggressiveness in an indirect, passive manner rather than in a direct, active manner. It may be the case that passive aggressive behavior presents a lower risk of punishment (i.e., of getting caught) to the patrol officer and thus is more common than active aggressive behavior.

It is worth noting that the CRT was most effective in predicting (i.e., had the highest correlations with) supervisor rankings. This suggests that the aggressiveness and prosociability of patrol officers had substantial influence on the rankings made by supervisors. Further, this suggests that the aggressiveness and prosociability of patrol officers influences the quality of interaction with supervisors more than it influences the amount of activity in which an officer engages. It may be the case that interaction with authority figures (i.e., supervisors) is more likely to elicit patrol officer aggressiveness than interaction with people who lack authority and do not threaten the power of patrol officers (i.e., the general public).

Prospects

Having discussed the indicated validity of a conditional reasoning measure of aggressiveness and prosociability, it is informative to reflect on which types of problems worked well (i.e., had significant correlations with criteria in the predicted direction) and which problems did not. Examination of the eight problems that worked suggests that conditional reasoning problems designed to elicit individuals' hostile attribution bias are particularly effective. Five of the eight problems required respondents to infer the motives underlying another person's ambiguous behavior. The success of these problems suggests that aggressive people are predisposed to infer malicious intent from ambiguous behavior, while prosocial people are not prone to make this type of attribution. The aggressive solutions in the hostile attribution bias problems describe negative outcomes resulting from another person's actions, while the prosocial problems describe positive outcomes resulting from another person's behavior. Selection of the aggressive solution may reflect an inward focus or egocentricity and a concern for one's own treatment, especially one's own mistreatment; whereas selection of the prosocial solution may reflect an outward focus and a recognition of positive outcomes for people in general rather than the self specifically.

Another CR problem that functioned well suggests that problems with a downward social comparison theme (Wills,

1981) may also be effective in identifying aggressive personalities. The aggressive solution in this particular problem attributed a group's misfortunes to member's unwillingness to engage in aggressive behavior despite provocation. This solution serves to derogate or disparage the non-aggressive group by blaming their misfortune on their failure to stand up for their rights via aggressive behavior. This type of solution enables aggressive respondents to increase their subjective well-being by comparing themselves with a less fortunate other.

One final valid problem suggests that an externalization, victimization theme may also be effective in identifying aggressive personalities. The aggressive solution in this particular problem described a set of negative outcomes that were beyond the control of the actor. Endorsement of this type of solution may reflect an inclination on the part of aggressive individuals to assume the role of victim and to blame other people for their misfortunes.

Examination of the CR problems that did not work (i.e., did not have correlations with criteria that were both significant and in the predicted direction) revealed two primary issues. The first issue is the difficulty of writing aggressive conditional solutions that are both subtle and appealing to aggressive individuals. In two of the problems, the aggressive solution was not selected by any of the

respondents. This suggests that, in these cases, the prosocial solution was "too strong" in that it served as a main effect that masked any individual differences in latent motives.

The second issue revealed by the CR problems that did not work is the apparent ineffectiveness of problems designed to elicit an endorsement of aggressive behavior. Two of the problems contained aggressive solutions that linked positive outcomes with the use of aggressive behavior. Both of these problems had solutions with adequate p-values, but one set of solutions was not related to any criteria and the other was related to criteria in the direction opposite than was predicted. This suggests that these problems were tapping into individual differences in traits other than aggressiveness and prosociability.

Limitations

The nature of this study was exploratory, and the results of this study must be interpreted with caution. The size of the sample and the distribution of the conditional reasoning problems bring the stability of the results into question. The stability of bivariate correlations and scale validities computed on 140 cases involving variables with extreme p-values certainly must be considered.

Also worthy of consideration is the issue of self-selection among the subjects. Of the 180 incumbent patrol

officers eligible to participate in the selection testing, 36 officers opted for early retirement. The possibility exists that the remaining subject pool is not representative of the entire population of patrol officers. It may also be the case that the remaining subject pool does not contain a full range of scores on the personality constructs of interest.

Summary

The results of this study suggest that conditional reasoning may serve as a valid means of measuring aggressiveness and prosociability. Eight of the fourteen CR problems written for this administration had correlations with various performance criteria that were both significant and in the predicted direction. Specifically, aggressive solutions to CR problems were negatively correlated, and prosocial alternatives to CR problems were positively correlated, with patrol officer activity, supervisor performance ratings, and supervisor rankings. These results suggest that aggressive solutions were predictive of low or poor performance and perhaps indirect, passive aggressive behavior.

Two additional points are noteworthy in regard to this study. First, patrol officers responded to the CRT as part of a real screening procedure. Thus, dissimulation or impression management motives were present, and the observed validities are reflective of the predictive effectiveness

that can be expected in real screening situations. Second, all of the patrol officers appeared to accept the conditional reasoning test as nothing other than an inductive reasoning test. Thus, the desire to measure natural reasoning processes indirectly appears to have been satisfied.

Future Research

The immediate goal for future research is to develop additional CR problems to measure aggressiveness and prosociability. Problems will be constructed based on themes that were shown to be effective in this study, such as hostile attribution, derogation, victimization, and externalization. The longer term goal of future research is to validate this conditional reasoning measure on samples with high baserates of aggressive behavior, such as juvenile delinquents and prisoners.

REFERENCES

REFERENCES

- Baron, R. A. (1977). *Human aggression*. New York: Plenum Press.
- Berkowitz, L. (1986). *Survey of social psychology*. New York: Holt, Rinehart, & Winston.
- Buss, A. H. (1961). *The psychology of aggression*. New York: John Wiley.
- Buss, A. H. & Perry, M. (1992). The aggression questionnaire. *Journal of Personality and Social Psychology*, 63, 452-459.
- Caprara, G. V., & Pastorelli, C. (1989). Toward a reorientation of research on aggression. *European Journal of Personality*, 3, 121-138.
- Dodge, K. A. & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology*, 53, 1146-1158.
- Dodge, K. A. & Frame, C. L. (1982). Social cognitive biases and deficits in aggressive boys. *Child Development*, 53, 629-635.
- Eisenberg, N. & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin*, 101, 91-119.

- Felson, R.B. & Tedeschi, J.T. (1993). Social interactionist perspectives on aggression and violence: An introduction. In R. Felson & J. Tedeschi (Eds.), *Aggression and violence: Social interactionist perspectives* (pp. 1-10). Washington, D.C.: American Psychological Association.
- Galotti, K. M. (1989). Approaches to studying formal and everyday reasoning. *Psychological Bulletin*, 105, 331-351.
- Huesmann, L. R. (1987). An information processing model for the development of aggression. *Aggressive Behavior*, 14, 13-24.
- James, L. R. (1995). Measurement of personality via conditional reasoning. *Journal of Applied Psychology*.
- Knight, G. P., Johnson, L. G., Carlo, G., & Eisenberg, N. (1994). A multiplicative model of the dispositional antecedents of a prosocial behavior: Predicting more of the people more of the time. *Journal of Personality and Social Psychology*, 66, 178-183.
- Kuhn, D. (1991). *The skills of argument*. New York: Cambridge University Press.
- Landy, F. J. & Farr, J. L. (1980). Performance rating. *Psychological Bulletin*, 87, 72-107.
- Lord, F. M. & Novick, M. R. (1968). *Statistical theories of mental test scores*. Reading, MA: Addison-Wesley.

- Pulkkinen, L. (1987). Offensive and defensive aggression in humans: A longitudinal perspective. *Aggressive Behavior*, 13, 197-212.
- Rosenzweig, S. (1965). Types of reaction to frustration: An heuristic classification. In C. L. Stacey & M. F. DeMartino (Eds.), *Understanding human motivation* (pp. 376-378). Cleveland, OH: The World Publishing Company.
- Wagner, R. K. & Sternberg, R. J. (1985). Practical intelligence in real-world pursuits: The role of tacit knowledge. *Journal of Personality and Social Psychology*, 49, 436-458.
- Wagner, R. K. & Sternberg, R. J. (1986). Tacit knowledge and intelligence in the everyday world. In R. J. Sternberg & R. K. Wagner (Eds.), *Practical intelligence: Nature and origins of competence in the everyday world*. New York: Cambridge University Press.
- Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin*, 2, 245-271.

VITA

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