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ABSTRACT

A previous research report described a prototype measure of the skill of negotiation in interpersonal competency and the results of an initial validation study of that measure. This report describes the results of two further validation studies of the computer simulation negotiation skill measure. In study 1, 37 second- and third-year law students nearing the end of a course on negotiation participated as experts, while 248 high school students served as novices in negotiation. Results support the construct validity of the measure, clearly distinguishing between experts and novices. In study 2, 51 high school students randomly assigned to groups performed the simulation as teams. As expected, three-person teams performed somewhat better than two-person teams, but there were no significant effects of group size. Results indicate that a collaborative environment is feasible. Both studies also demonstrate that cognitive biases are associated with lower negotiation performance, and that experts exhibit more self-regulation than novices. Appendixes describe the negotiation scenario and provide two study questionnaires. Two figures and 29 tables present study findings. (Contains 38 references.) (SLD)

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Project 2.1 Designs for Assessing Individual
and Group Problem Solving

Report on Preliminary Study to Test Prototype Workforce Readiness Group Problem-solving Task and Scoring System

Assessment Issues in the Validation of a Computer Simulation of Negotiation Skills

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ASSESSMENT ISSUES IN THE VALIDATION OF A COMPUTER SIMULATION OF NEGOTIATION SKILLS

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Introduction[1]

CRESST/UCLA has an existing grant from the Office of Educational Research and Improvement to study methodologies for the assessment of competencies needed for the workforce. CRESST/UCLA areas of interest include both assessment and policy issues. In a previous report (O'Neil, Allred, & Dennis, 1992) we described one prototype measure of the negotiation subskill of interpersonal competency and reported the results of an initial validation study of that measure. In this report, we describe the results of two further validation studies of our negotiation skill measure. We begin with a description of our prior work in negotiation skills to provide the context and rationale for the present research.

The CRESST Negotiation Simulation

Because of their documented importance in the workforce (O'Neil, Allred, & Baker, 1992b), we have developed a measure of negotiation skills and have conducted studies of its construct validity. In creating this measure, we have followed the general methodology for the development of workforce readiness measures we developed in an earlier report (O'Neil, Allred, & Baker, 1992a). As shown in Figure 1, that methodology dictates that in developing measures of a performance competency like workforce readiness skills, a job and task

[1] The authors would like to thank Drs. Randy Lowry, Cheryl McDonald, and Peter Robinson of the Institute for Alternative Dispute Resolution, Pepperdine University, for their assistance. We also wish to thank the principal, students and teachers at Twin Falls High School, Twin Falls, ID, for their assistance.

General Methodology	Specific Example
Select a work environment	Analytically derived
Job and task analysis	Analytically derived
Select competency	Interpersonal
Conduct component analysis of competency	Negotiate
Specify basic skills foundation	Mathematics, Creative Thinking, Decision Making, Problem Solving, Self-Management
Create indicator(s) for subcompetencies	Proposing and examining possible options and making reasonable compromises
Classify indicator(s) within a cognitive science taxonomy	Carnevale & Pruitt, 1992; Walton & McKersie, 1965; Womack, 1990
Create rapid prototype of measures of indicator(s) via test specifications	Existing simulation modified
Select/develop final measures of indicator(s)	See Methodology section
Select experimental/analytical design	Expert/Novice
Run empirical studies	This report
Analyze statistically	This report
Use/create norms	To be done
Report reliability/validity of indicator(s) measure	This report
Report on workforce readiness using multiple indicators	To be done

Figure 1. Workforce readiness assessment methodology for SCANS: Negotiation example.

analysis should be conducted to identify particular skills necessary for performance in the domain of interest. Subsequently, the relevant research literature is surveyed for the cognitive indicators documented to correlate with performance on those identified skills. Particular competency measures can then be developed based on those cognitive indicators.

Based on the assessment of the performance criteria by the Secretary's Commission on Achieving Necessary Skills (SCANS) (U.S. Department of Labor, 1991, 1992) and the cognitive indicators of those performance criteria, we developed a rapid prototype of negotiation simulation. With regard to the SCANS performance criteria, we needed to simulate the activities of proposing and examining options and making reasonable compromises. Accordingly, the negotiation task is the exchange of proposals and counterproposals. With regard to the cognitive indicators identified in the negotiation literature (e.g., Kelley, 1979; Kelley & Thibaut, 1978; Pruitt & Rubin, 1986; Rubin & Brown, 1975; Walton & McKersie, 1965), the exchange of proposals should take place in the context of a situation of mixed-motive interdependence, with both distributive and integrative dimensions. There is also an extensive literature on the distinction between distributive and integrative negotiation (e.g., Brett, Goldberg, & Ury, 1990; Pruitt & Rubin, 1986; Pruitt & Syna, 1984; Rahim, 1986; Tjosvold, 1990; Tjosvold & Johnson, 1983; Walton & McKersie, 1965; Womack, 1990).

Distributive negotiation focuses on the distribution of the available outcomes to each of the parties. Distributive negotiations concern the zero-sum or win/lose elements of a negotiation. One presumably seeks to gain as high outcomes as one can, but must also see that the other side gets enough to agree to the resolution. Integrative negotiation involves seeking ways in which the outcomes available to the parties can be expanded. Integrative negotiation involves variable sum or win/win aspects of negotiations.

We will now describe the negotiation simulation with an emphasis on a conceptual explanation of how we simulate and measure the cognitive indicators of the criteria identified. The logic for the use of simulation as an assessment context is documented in our prior report (O'Neil, Allred, & Dennis, 1992). Our use of a computer simulation for assessment purposes is consistent with the guidelines for computer testing (Green, 1991). The simulation was conducted via computer, and a full description of the logistics

of the simulation is found in the procedure sections of this report. As may be seen in Figure 2, there are multiple domain specifications (e.g., Baker & Herman, 1990; Millman & Greene, 1989) embedded in the software.

The negotiation scenario is a job contract negotiation. The parties to the negotiation are a representative of the potential employer and the potential employee. Two scenarios entailing different employers and employees were used in the validation studies reported here. The conceptual framework for

General Domain Specification	Specific Example
Scenario	Role play a job contract negotiation by exchanging proposals in mixed motive context
Players	One student and one manager (computer software)
Student	Either expert or novice, individual or team
Manager	Computer software (Carnevale & Conlon, 1988; O'Neil, Allred, & Dennis, 1992)
Priorities	Offsetting
Moves	Reciprocal
Rounds	Offer from student and counteroffer from manager
Subcompetencies	Propose options; make reasonable compromises
Negotiation issues	Three in number (e.g., salary) with offsetting priorities
Negotiation measures	Agreement (yes/no), type of agreement (distributive vs. integrative), final counteroffer
Cognitive processes (domain-dependent)	Fixed-pie bias, self-serving bias
Cognitive processes (domain-independent)	Metacognitive skills
Affective processes (domain-independent)	Effort, anxiety

Figure 2. Domain specifications embedded in the software.

the simulation situation will be described in terms of the movie theater scenario used with half the subjects in the first study and all subjects in the second study. In this scenario, the contract negotiation takes place between a high school student and the manager of a movie theater. In the simulation, the high school student is seeking employment and the movie theater manager is looking to hire. Thus there is some interdependence between the parties based on the compatible interests of working out an employment relationship. In the simulation, the two parties have come together to negotiate the terms of the contract with respect to three issues: (a) free movie passes, (b) weekend hours, and (c) hourly wage. The high school student prefers to have more movie passes, to work fewer hours on the weekend, and to have a higher hourly wage. In contrast, the movie theater manager prefers that the high school student receive fewer passes, work more weekend hours, and receive a smaller hourly wage. Thus, there are also some incompatible or competitive aspects to the interdependence between the two parties.

To build in both integrative and distributive dimensions to the simulation, the parties also have offsetting priorities regarding the three issues being negotiated. Because the high school student is characterized as being a big movie buff, the free passes issue is most important to him or her as the passes are worth $7.50 each. Because the high school student likes time free on the weekends, the weekend hours issue is moderately important to him or her. Because the range of the hourly wages being negotiated is quite trivial to the student, the hourly wage issue is least important. In contrast, the movie theater manager's most important issue is the hourly wage, followed by the weekend hours and free passes issues, respectively.

The offsetting priorities create some integrative potential in the negotiation simulation. The high school student can compromise on the issue of least importance to him or her (hourly wage) in exchange for a concession from the movie theater manager on the issue of most importance to the high school student (free passes). The movie theater manager is likely to be willing to do this because he or she receives a better arrangement on the issue of most importance to him or her (hourly wage) in return for a concession on the issue of least importance to him or her (free passes). Pruitt and Rubin (1986) refer to such trading off of issues of different priority as a "logrolling" integrative strategy. Besides this integrative aspect of the negotiation, both parties must

also consider the total, overall distribution of the good outcomes between the parties to be generated by the conclusion of a job contract.

The subject's task in the simulation is to exchange proposals and messages with the other side to try and reach an agreement. As will be explained in the procedure sections, the subject is led to believe that the "other party" is also sitting at a networked computer terminal in a computer laboratory just as the subject is. In fact, the "other party" is a computer program designed to reciprocate the subject's proposals in terms of the opposing interests identified.

Because of the mixed-motive interdependence built into the negotiation situation, subjects will be successful in achieving attractive agreements to the extent they exchange offers with the dual concerns in mind as discussed above. Specifically, the subject (who always plays the role of the person seeking employment, which in this particular scenario is the high school student) will need to propose options and make reasonable compromises. In order to be successful in this context, the options and compromises must take into account the high school student's interests as well as the interests of the programmed movie theater manager along both the distributive and integrative dimensions. With respect to the distributive aspect of the negotiations, the computer will respond with counterproposals that distribute the outcomes based on the same balance of self and other's interests as the subject's proposal. With respect to the integrative aspect of the negotiations, the programmed movie theater manager will offer a counterproposal that makes a concession on the free passes issue equal to the concession the subject made on the hourly wage issue in his or her proposal.

With the negotiation situation so constructed and the movie theater manager's counterproposals so programmed, the movie theater manager's counteroffer is a measure of the subject's skill in proposing and examining options and in making reasonable compromises. Regarding proposing and examining options specifically, the movie theater manager's counterproposal reflects the same balancing of the interests of both parties as the subject's proposal reflected. In other words, the movie theater manager's counterproposal reflects the subject's skill with respect to the distributive aspect of proposing and examining options. The movie theater manager's counterproposal also reflects the subject's skill with respect to the integrative

aspect of proposing and examining options. The counterproposal will offer the same level of concession on the issue of least importance to the movie theater manager as the level of concession the subject offered on the issue of least importance to him or her.

Similarly, the manager's counterproposal is also a measure of skill in making reasonable compromises. With respect to the distributive aspect of skill in making reasonable compromises, the movie theater manager's counterproposal reflects the same level of compromise of one's own interests for the other party's interests as the subject's offer. With respect to the integrative aspect of skill in making reasonable compromises, the manager's counterproposal reflects the level of providing the other side with higher outcomes without an equal sacrifice of one's own outcomes. Specifically, the movie theater manager's counterproposal reflects the same level of conceding on the issue of least importance to one's self to provide greater outcomes to the other party of the issue of greatest importance to them.

Common Hypotheses of the Present Studies

Hypothesis 1: Experts will perform better than novices.

We conducted a preliminary validation study of our negotiation skill measure based on an expert/novice criterion group approach (O'Neil, Allred, & Dennis, 1992). A test with construct validity should discriminate between experts and novices in that skill. Accordingly, we conducted the simulation with both novices and experts in negotiation. Eighteen high school students served as novices and nine graduating MBA students who had just completed a course on negotiation served as experts. We wanted to conduct a preliminary study to document whether further validation studies were warranted.

The mean value of the counterproposals the experts exhibited was higher than that of novices. These differences approached statistical significance ($p = .064$). Additionally, in terms of actual agreements, the experts concluded more and higher quality agreements than novices. The expected differences did indicate that larger scale validation studies were warranted. Based again upon an expert/novice criterion group approach and the results from the initial validation study, we expected experts in the present study to perform better than novices.

Hypothesis 2: Experts will exhibit less fixed-pie bias than novices.

In addition to performance, we were interested in examining domain-specific cognitive processes known to be related to negotiation outcomes. Evidence that cognitive processes related to negotiation performance in other contexts were also related to performance in our simulation would further support the construct validity of our simulation. According to the cognitive perspective in psychology, people manage interdependence by accurately processing and interpreting both (a) the negotiation *situation* and (b) the *other party* with whom one is negotiating (Thompson, 1990b). The decision-analytic perspective (e.g., Neale & Bazerman, 1991; Raiffa, 1982) has proved a powerful framework for understanding how negotiators process and understand negotiation situations. Research conducted within the decision-analytic framework has identified, among other biases, a fixed-pie bias which prevents people from realizing the potential for increasing joint gains which often exist (Bazerman, Magliozzi, & Neale, 1985; Thompson, 1990a, 1991, Thompson & Hastie, 1990). The fixed-pie bias is the tendency people have to assume there is a fixed amount of outcomes to be distributed which cannot be expanded. Accordingly, a gain for one side means an equal loss for the other side and vice versa. The fixed-pie bias thus prevents people from pursuing integrative potential or seeking to expand the pie. In particular, the fixed-pie bias has been reported in the same type of negotiation context that we use. For example, Bazerman, Thompson, and their colleagues have documented that people tend to assume that what is most important to them is also most important to the other party. Consequently, the potential for joint gain is often unrealized. Based upon this research we hypothesized the following for the present study: Experts will exhibit less fixed-pie bias than novices.

Hypothesis 3: Experts will exhibit less self-serving bias than novices.

Although it has received less attention by negotiation researchers, the attributional perspective in social psychology also suggests processes by which negotiators interpret the other party in a negotiation. According to the attributional perspective, how we interact with another person is partly a function of the causal attributions we make about how and why the people with whom we are interacting are behaving as they are (e.g., Heider, 1958; Weiner, 1986). In the context of negotiations specifically, behavior will be dependent in

part on how the person interprets the behavior of the parties with whom he or she is negotiating (Sillars, 1981).

We suggest that a particularly important aspect of attributions in negotiation concerns the judgments of the relative degree of reasonableness, of cooperativeness, and of concern for the opposite party exhibited by one's self and by the other party. Specifically, we predicted that people would exhibit a self-serving attributional bias such that they would tend to perceive themselves as more concerned for the other party, more cooperative, and more reasonable than the other party (Kramer, Newton, & Pommerenke, 1993; Sillars, 1981).

The implications of a self-serving bias for negotiator performance seem clear. To the extent that one perceives oneself to be more reasonable or concerned for the other party's welfare, one is likely to feel exploited and reciprocate by exhibiting less cooperation and concern subsequently. As a result of a self-serving bias, one is likely to demand greater compromises from the other party than the situation would otherwise dictate. The probable result is to interfere with the ability of parties to reach agreements satisfactory to both parties.

Because the other party's behavior was programmed to be a mirror image of the subject's negotiating behavior, differences in subject ratings of the subject's own behavior and the other party's behavior are a measure of a self-serving bias. Thus, although the empirical support for the link between self-serving biases and negotiator performance is limited, we hypothesized that the relationship would emerge in our simulation. Specifically, we hypothesized the following: In this study, experts will exhibit less self-serving bias than novices.

Hypothesis 4: Experts will exhibit more self-regulatory activity than novices.

One aspect of our research on assessing negotiation skills was focused on self-regulating processes (Glaser, Raghavan, & Baxter, 1992). We view self-regulating processes as consisting of metacognition, effort, and anxiety. In turn, metacognition consists of planning, self-monitoring, cognitive strategies, and awareness. We have developed state measures of these constructs (O'Neil, Sugrue, Abedi, Baker, & Golan, 1992). We reasoned that if students were engaged in our computer-based simulation of negotiation, we could expect experts to exhibit more metacognitive activity and effort with less anxiety.

Specific Hypotheses of Study 1

Hypothesis 5: There will be no differential effects of scenario.

In Study 1, in addition to the common hypotheses identified above, we were also interested in examining the effects of different scenarios of the same basic simulation. Thus, in addition to the movie theater scenario described above, we employed a scenario in which a third-year law student was negotiating a job contract with a law firm. We anticipated there would be no significant effects for scenario in terms of performance, fixed-pie bias, self-serving bias, or self-regulatory skills.

Method (Study 1)

Subjects. One group of expert and one group of novice negotiators participated. Thirty-seven second- and third-year law students who were nearing completion of a course on negotiation participated as experts. Twenty-four were males and 13 were females. The average age of the law students was 28. Their law negotiation course focuses on integrative and distributive aspects of effective negotiation. In addition to lectures and discussions, the course included simulations designed to provide the students with practical experience with the principles discussed. However, no simulation was based on the exact paradigm employed in our simulation. The students participated during regular class time as part of the requirements for the course. The subjects participated in one of two sessions conducted in the law school's computer laboratory which has 20 IBM personal computers.

Two hundred forty-eight novice participants were drawn from various classes of college-bound students in a public high school with a total of approximately 1400 students. One hundred forty-six were females and 102 were males. Sixty-eight participants were sophomores, 86 were juniors, and 94 were seniors. All students participated as part of the classroom activity for that day. The students came to one of the two high school computer laboratories, each of which had 20 IBM personal computers.

Procedure. Each subject was seated in front of an IBM personal computer which presented the instructions, task, and subsequent questionnaire. The

computer program used was a modification of Carnevale's program (e.g. Carnevale & Conlon, 1988).[2]

Subjects were instructed that they would negotiate with others via the computer. Subjects were randomly assigned to either the movie theater scenario described above or a scenario involving employment negotiations between a graduating law student and a law firm. The procedure will be described in terms of the movie theater scenario. For more details on the law firm scenario, see Appendix 1. The computer, the subjects were instructed, would randomly assign the subject to the role of either a movie theater manager seeking to hire a high school student or a high school student seeking employment with a movie theater. In fact, the computers were not network-aware, and all subjects played the role of the high school student (or law student in the law firm scenario), while the role of the movie theater manager (or law firm representative in the law firm scenario) was programmed.

Subjects were instructed that the job contract negotiation centered on three issues: (a) the number of free, transferable passes per month the high school student would receive, (b) the number of weekend hours the student would work of the 10 total hours worked per week, and (c) the hourly wage the high school student would receive. Subjects were told that they preferred more free passes, fewer weekend hours, and higher hourly wages, whereas the personnel manager preferred fewer passes, more weekend hours, and lower hourly wages. Subjects were also instructed that the parties would exchange proposals in the negotiation in trying to reach agreement on one proposal level for each issue. The computer presented the subjects with the issue chart shown in Table 1. Subjects did not have a paper copy of this chart.

The subjects were also instructed with respect to their relative priorities on the three issues. Because there was a difference of only 10 cents per hour between each level of the hourly wage issue, the subjects were told the hourly wage issue was least important to them. The subjects were also told that the person they were role-playing really enjoyed movies. Because each level on the passes issue represented a $7.50 ticket, the subjects were further told, the

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[2] We thank Dr. Peter Carnevale who provided his program for us to modify for this set of studies.

Table 1

High School Student Issue Chart of Real Values

Issues		
Passes (per month)	Weekend hrs (per week)	Wage (per hour)
A 9	A 2	A 5.05
B 8	B 3	B 4.95
C 7	C 4	C 4.85
D 6	D 5	D 4.75
E 5	E 6	E 4.65
F 4	F 7	F 4.55
G 3	G 8	G 4.45
H 2	H 9	H 4.35
I 1	I 10	I 4.25

passes issue was most important to them. The subjects were also told that the weekend hours issue, which represented one weekend hour for each level, was moderately important to the high school student seeking employment. A second issue chart was presented on the computer screen (see upper half of Table 2) representing these relative preferences in that the highest points attainable were on the free passes issue, followed by the weekend hours and hourly wage issues respectively.

Although the subjects were not shown the movie theater manager's priorities on the three issues, the role was programmed with the assumption that the manager's priorities were exactly offsetting (see lower half of Table 2). Thus, integrative potential was structured into the job-contract negotiation, such that if the parties reciprocally conceded on the issue of least importance to them, joint outcomes could be maximized (EEE yields 120 points for each, while AEI yields 160). The manager's role was further programmed to reciprocate moves made by subjects. Specifically, a concession by the subject on the hourly wage issue was answered by the programmed manager with an equal concession on the free passes issue. The manager's role was programmed to follow a simple tit-for-tat strategy on the weekend hours issue.

Table 2

High School Student and Movie Theater Manager Issue Chart of Point Values

Issues		
Passes (per month)	Weekend hrs (per week)	Wage (per hour)
High school student		
A 120	A 80	A 40
B 105	B 70	B 35
C 90	C 60	C 30
D 75	D 50	D 25
E 60	E 40	E 20
F 45	F 30	F 15
G 30	G 20	G 10
H 15	H 10	H 5
I 0	I 0	I 0
Movie theater manager		
A 0	A 0	A 0
B 5	B 10	B 15
C 10	C 20	C 30
D 15	D 30	D 45
E 20	E 40	E 60
F 25	F 50	F 75
G 30	G 60	G 90
H 35	H 70	H 105
I 40	I 80	I 120

In other words, the computer would concede the same number of proposal levels from its most favored level (I) as the subject would from his or her most favored level (A). Finally, the manager's role was programmed such that it would accept any proposal as an agreement that offered it the points equal to EEE (120) or better. Consequently, the programmed negotiator mirrored the subject's negotiating behavior in terms of whether proposals moved toward realizing the integrative potential or not. Additionally, it was not possible for

the subject to conclude an agreement valued at more than 120 points without engaging in logrolling.

The computer presented the subjects with two practice rounds of exchanging proposals before the actual negotiations began. The subjects were instructed that the negotiations would continue until an agreement was reached or until the negotiation had proceeded for 12 rounds, with one exchange of proposals constituting one round. After the last round of the negotiations, the subjects completed a questionnaire presented on the computer screen (see Appendix 2). The questions were designed as measures of the fixed-pie bias and the self-serving bias. With respect to the fixed-pie bias, subjects were asked which of the three issues was most important to them and which was least important to them, as well as which issue they thought was most and least important to the other party. With respect to the self-serving bias, the subjects were asked to rate how concerned with the other party's interests they were and how concerned the other party was with the subject's interests. Subsequently, subjects were also asked how reasonable or fair their proposals and the other party's proposals were. Subjects answered the four self-serving bias questions on 7-point Likert scales. Following the questionnaire presented on computer, the subjects responded to a paper-and-pencil self-regulation questionnaire developed by O'Neil, Sugrue, Abedi, Baker, and Golan (1992) (see Appendix 3).

After finishing, the subjects were debriefed. The experimenters explained that the computers were not network aware and that the subjects were interacting with a computer program. The experimenters further explained how the computer was programmed to reciprocate the subjects' negotiating behavior. Finally, the experimenters explained that the best agreement possible was AEI and offered lessons that could be learned from the experience for real negotiations the subjects might encounter. No subjects appeared to be upset by the deception, and most found it amusing that they had, in effect, been negotiating with a mirror image of themselves. The subjects were then thanked for their participation.

Results (Study 1)

The results were generally supportive of the hypotheses. With respect to hypothesis 1, that experts would perform better then novices, we measured

performance in three ways. First, as described above, the value of the final counteroffer the subject elicited from the programmed employer is a measure of negotiation skill. As seen in Table 3, experts elicited final counteroffers of greater value to themselves than did novices in both the theater and law scenarios. An analysis of variance showed this main effect for criterion group to be significant, $F(1, 284) = 9.28$, $p < .001$. As expected, there was no main effect or interaction for scenario. However, the interaction approached statistical significance, $F(1, 128) = 2.99$, $p = .085$.

A second measure of performance was the frequency of actual agreements. In the final counteroffer measure all subjects are included, whether they actually concluded an agreement or not. Thus, we thought it also important to examine actual agreements concluded. As seen in Table 4, experts more frequently concluded agreements than novices. As also seen in Table 4, however, the chi-square analyses showed that this difference only approached significance ($p = .059$). With respect to scenario effects, contrary to our expectations, subjects in the theater scenario concluded agreements significantly more frequently than subjects in the law scenario, as seen in Table 5. We will say more about this result below.

Table 3

Mean Final Counteroffer Performance Measure (Entire data set)

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	111.77 (29.14)	111.29 (28.89)
n	124	124
Expert		
Mean (*SD*)	136.11 (19.67)	118.16 (31.06)
n	18	19

Table 4

Frequency of Agreement by Criterion Group (Entire data set)

	Criterion group		
	Novice	Expert	*n*
Agreement	155 (62.5%)	29 (78.4%)	184
No agreement	93 (37.5%)	8 (21.6%)	101
Total *N*	248 (100.0%)	37 (100.0%)	285

Note. $\chi^2 = 3.55$. $df = 1$. $p = .059$.

Table 5

Frequency of Agreement by Scenario (Entire data set)

	Scenario		
	Theater	Law	*n*
Agreement	101 (71.1%)	83 (58.0%)	184
No agreement	41 (28.9%)	60 (42.0%)	101
Total *N*	142 (100.00%)	143 (100.0%)	285

Note. $\chi^2 = 5.33$. $df = 1$. $p = .02$.

A third measure of performance was the frequency of integrative versus distributive agreements reached. In other words, of those agreements actually reached, did experts tend to achieve integrative agreements more frequently? Our results offer strong evidence that the answer is yes. As described above, subjects had to engage in integrative logrolling strategy to achieve an agreement of greater value than 120. Thus, we examined the frequencies of agreements above 120 versus those at or below 120. As seen in Table 6, experts' agreements were integrative almost two-thirds of the time, while novices' agreements were integrative less than one-third of the time. The chi-square analysis, as also seen in Table 6, showed this difference to be extremely significant. As seen in Table 7, with respect to scenario effects, subjects

Table 6

Frequency of Integrative vs. Distributive Agreements by Criterion Group (Entire data set)

	Criterion group		
	Novice	Expert	*n*
Distributive	99 (63.9%)	7 (24.1%)	106
Integrative	56 (36.1%)	22 (75.9%)	78
Total *N*	155 (100.0%)	29 (100.0%)	184

Note. $\chi^2 = 15.79$. $df = 1$. $p < .001$.

Table 7

Frequency of Integrative vs. Distributive Agreements by Scenario (Entire data set)

	Scenario		
	Theater	Law	*n*
Distributive	54 (53.5%)	52 (62.7%)	106
Integrative	47 (46.5%)	31 (37.3%)	78
	101 (100.00%)	83 (100.0%)	184

Note. $\chi^2 = 1.57$. $df = 1$. $p = .20$.

achieved integrative agreements with about the same frequencies as they achieved distributive agreements. The differences were not significant.

The above results provided strong support for our main hypothesis that experts perform better in the simulation than novices. However, the prediction that there would be no scenario effects was confirmed in two of the three measures but was contradicted in the frequency of agreement analyses (see Table 5). After having collected the data, we discovered a programming error in the simulation program in the law scenario version. This error may explain the above inconsistent results. For reasons that are yet unclear to us, the program responded inaccurately when the subject offered the other party a

proposal which included an "F" on the billable hours issue, which was the issue of least importance to the subject. Rather than responding with a counterproposal which included a "D" on the subject's most important issue, as it should have, the program countered with a proposal which included "F" on the most important issue as well as an "F" on the least important issue. Thus, in this particular case, the program did not reciprocate a subject's move toward an integrative solution, although it did in all other cases. Because the program would always respond to an "F" this way in the law scenario, but always responded appropriately in the theater scenario, we have a confound between the scenario and the program error. Thus, it seems likely that the observed lower frequency of agreement in the law scenario may be due to this computer program error.

To further examine this issue, we have conducted the same analyses described above with a subset of the total sample. This second set of analyses was conducted for law scenario subjects who did not encounter the program error and all theater scenario subjects, because no theater scenario subjects actually encountered the error.

The means and standard deviations for the final counteroffers for this subset of the data are presented in Table 8. As seen in Table 8, experts outperformed novices, $F(1, 212) = 9.082, p < .001$. No other main effect or interaction was significant. The results for the frequency of agreement of expert versus novice analyses for the subset of the data are presented in

Table 8

Mean Final Counteroffer Performance Measure (Subset of data)

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	111.77 (29.14)	109.44 (31.08)
n	124	63
Expert		
Mean (*SD*)	136.11 (19.67)	115.00 (35.15)
n	18	8

Table 9. Experts reached agreement significantly more often than novices. The significance difference in frequency of agreement for law scenario versus theater scenario subjects found for the entire data set (Table 5) does go away for these subjects, who did not encounter the computer error (see Table 10). As shown in Table 10, there were significantly more agreements in the theater scenario. The results for the frequency of integrative versus distributive agreements in this subset of the data are presented in Table 11. Experts achieved significantly more integrative solutions than novices. Finally, there was no effect of scenario on integrative versus distributive agreements (see Table 12).

Table 9

Frequency of Agreement by Criterion Group (Subset of data)

	Criterion group		
	Novice	Expert	*n*
Agreement	117 (62.6%)	23 (88.5%)	140
No agreement	70 (37.4%)	3 (11.5%)	73
	187 (100.0%)	26 (100.0%)	213

Note. $\chi^2 = 6.79$. $df = 1$. $p < .01$.

Table 10

Frequency of Agreement by Scenario (Subset of data)

	Scenario		
	Theater	Law	*n*
Agreement	101 (71.1%)	39 (54.5%)	140
No agreement	41 (28.9%)	32 (45.1%)	73
	142 (100.00%)	71 (100.0%)	213

Note. $\chi^2 = 5.51$. $df = 1$. $p < .02$.

Table 11

Frequency of Integrative vs. Distributive Agreements by Criterion Group (Subset of data)

	Criterion group		
	Novice	Expert	*n*
Distributive	73 (62.4%)	5 (21.7%)	78
Integrative	44 (37.6%)	18 (78.3%)	62
	117 (100.0%)	23 (100.0%)	140

Note. $\chi^2 = 12.88$. $df = 1$. $p < .001$.

Table 12

Frequency of Integrative vs. Distributive Agreements by Scenario (Subset of data)

	Scenario		
	Theater	Law	*n*
Distributive	54 (53.5%)	24 (61.5%)	78
Integrative	47 (46.5%)	15 (38.5%)	62
	101 (100.00%)	39 (100.0%)	140

Note. $\chi^2 = 1.74$. $df = 1$. $p = .38$.

To summarize the performance results, it seems clear that experts perform better than novices. However, the program error makes it difficult to know whether there is an effect of scenario on performance.

The hypotheses relating to fixed-pie bias were also strongly supported by the statistical results. The measure of fixed-pie bias will be discussed in terms of the movie theater scenario. The movie theater manager's role was programmed with the assumption that his or her most important issue was hourly wage and least important issue was passes. The issue of weekend hours was moderately important to the programmed theater manager. Thus, if the subjects answered that the other party's least important issue was

passes and that their most important issue was hourly wage, they received a zero for each response, indicating no bias. If subjects answered that the weekend hours issue was most important, they received a 1 for that item; or if they answered that the weekend hours issue was the least important issue, they received a 1, reflecting a moderate mistake in the perception of the other party's priorities. If subjects answered that the manager's most important issue was passes (when actually passes were least important to the manager), they received a 2 for that item, indicating a major mistake in the perception of the other party's priorities. Similarly, subjects received a 2 if they answered that the hourly wage was most important to the manager. The subjects' scores for the two items were summed to create a fixed-pie bias measure in which a zero indicates no bias and a 4 indicates the most extreme form of the bias.

As seen in Table 13, experts, as predicted, were significantly less biased than novices, $F(1, 284) = 6.84, p < .01$. However, there was also a main effect for scenario, $F(1, 284) = 35.12, p < .001$, such that subjects in the law scenario had more fixed-pie bias than subjects in the theater scenario. Table 14 shows the results for the analyses for the subset of the data according to the program error. The fixed-pie bias analyses reveal a significant effect for criterion group, $F(1, 212) = 4.35, p < .05$. There was also a significant effect of scenario, $F(1, 212) = 33.44, p < .001$.

Table 13

Mean Fixed-Pie Bias (Entire data set)

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	1.51 (1.50)	2.57 (1.55)
n	124	124
Expert		
Mean (*SD*)	0.78 (1.40)	1.89 (1.70)
n	18	19

Table 14

Mean Fixed-Pie Bias (Subset of data)

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	1.51 (1.50)	2.75 (1.50)
n	124	63
Expert		
Mean (*SD*)	0.78 (1.40)	2.25 (1.91)
n	18	8

The results do not support the self-serving bias hypothesis. Self-serving bias scores were computed as the difference in the ratings, on 7-point Likert scales, of the self and the other party on the questions of concern for opposite party, cooperativeness/competitiveness, and reasonableness/ unreasonableness, with higher numbers indicating greater self-serving bias. Experts were not significantly less biased with respect to ratings of concern for the opposite party, as seen in Table 15; nor was there any main effect for scenario. As seen in Table 16, novices actually perceived the other party to be more cooperative, while experts exhibited a clear self-serving bias with respect

Table 15

Mean Self-Serving Bias in Ratings of Concern for Other Party (Entire data set)

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	0.55 (1.52)	0.65 (1.42)
n	124	124
Expert		
Mean (*SD*)	0.06 (0.87)	0.84 (1.39)
n	18	19

Table 16

Mean Self-Serving Bias in Ratings of Cooperativeness (Entire data set)

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	-.07 (1.64)	-.11 (1.81)
n	124	124
Expert		
Mean (*SD*)	0.89 (1.37)	1.00 (2.06)
n	18	19

to cooperativeness, $F(1, 284) = 11.36$, $p < .001$. There was again no effect for scenario. As seen in Table 17, the results of the subsample are consistent in that only the main effect of expertise was significant, $F(1, 212) = 13.30$, $p < .001$. Experts were also somewhat more biased than novices with respect to ratings of reasonableness of self and other, as seen in Table 18. Table 18 also reveals that subjects in the law scenario were not more biased on the reasonableness dimension than subjects in the law scenario. There was no

Table 17

Mean Self-Serving Bias in Ratings of Cooperativeness (Subset of data)

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	-.07 (1.64)	-.08 (1.79)
n	124	63
Expert		
Mean (*SD*)	0.89 (1.37)	2.00 (2.73)
n	18	8

Table 18

Mean Self-Serving Bias in Ratings of Reasonableness (Entire data set)

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	1.00 (1.90)	1.26 (2.01)
n	124	124
Expert		
Mean (*SD*)	1.22 (1.63)	1.84 (2.01)
n	18	19

effect of scenario. As seen in Table 19, with respect to the subsample, results on the self-serving bias of reasonableness on the main effect of scenario were significant, $F(1, 212) = 5.13$, $p = .025$. It is also interesting to note that the experts seemed to be more biased in the law scenario than in the high school scenario on each of the three dimensions. Basically, with respect to bias, the same patterns found for the entire data set hold across the subset.

Table 19

Mean Self-Serving Bias in Ratings of Reasonableness (Subset of data)

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	1.00 (1.90)	1.57 (2.01)
n	124	63
Expert		
Mean (*SD*)	1.22 (1.63)	2.38 (2.07)
n	18	8

Self-regulation Results (Study 1)

In this study we viewed self-regulation as consisting of metacognition (self-checking and planning) combined with effort and worry. As seen in Tables 20 and 21, although experts exhibited more self-checking and planning activity, these differences only approached significance, $F(1, 281) = 3.19$, $p = .075$ and $F(1, 281) = 3.26$, $p = .072$ respectively. There was no effect of scenario in either analysis. With respect to effort (see Table 22), experts exhibited significantly more effort, $F(1, 281) = 3.99$, $p = .047$. There was no effect of scenario. With respect to worry (see Table 23), experts exhibited less worry than novices, $F(1, 281) = 9.91$, $p = .002$. There was no effect of scenario. Thus, in general, experts exhibited more self-regulatory behavior than novices. However, with respect to metacognition, these differences only approach significance ($p < .10$).

Table 20
Metacognition: Self-checking

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	2.66 (0.67)	2.68 (0.72)
n	124	124
Expert		
Mean (*SD*)	2.86 (0.59)	2.91 (0.53)
n	18	19

Table 21
Metacognition: Planning

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	3.07 (0.64)	3.02 (0.66)
n	124	124
Expert		
Mean (*SD*)	3.26 (0.57)	3.24 (0.40)
n	18	19

Table 22

Effort

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	3.19 (0.61)	3.15 (0.68)
n	124	124
Expert		
Mean (*SD*)	3.27 (0.62)	3.51 (0.36)
n	18	19

Table 23

Worry

	Scenario	
Criterion group	Theater	Law
Novice		
Mean (*SD*)	1.66 (0.50)	1.67 (0.53)
n	124	124
Expert		
Mean (*SD*)	1.34 (0.26)	1.44 (0.35)
n	18	19

Discussion (Study 1)

The purpose of the study was to investigate the construct validity of the negotiation skill measure we have developed. Our main test of validity was to see if the simulation approach we have developed would discriminate between expert/novice criterion groups. The results clearly indicated that the simulation does in fact discriminate between experts and novices. The mean final counteroffer experts elicited was significantly higher than the mean for novices. Furthermore, when an actual agreement was reached, experts concluded integrative agreements much more frequently than novices.

We also examined construct validity by investigating whether cognitive processes associated with negotiation performance in the negotiation literature were also associated with performance in the simulation. With respect to the fixed-pie bias, novices were clearly more biased than experts, further supporting the validity of our simulation. The results did not support our predictions concerning the self-serving biases, however. Experts generally exhibited no greater self-serving bias than novices.

One possible explanation of the failed self-serving bias results is the computer setting. The self-serving bias is an explicitly interpersonal bias, while the fixed-pie bias regards the negotiation situation rather than the other party. The self-serving bias may exert its influence on negotiation performance primarily through emotions that are generated in face-to-face interpersonal negotiations when one perceives a concrete other person who is showing less concern, cooperation, and reasonableness. It should also be repeated that the empirical evidence linking self-serving biases to negotiation performance is as yet quite small. Few empirical studies suggest a relationship between self-serving bias and negotiation performance (Kramer et al., 1993; Sillars, 1981), while there is clear empirical support for the link between the fixed-pie bias and performance (Neale & Bazerman, 1985; Thompson, 1991). It may be that the self-serving bias is simply not as strongly associated with negotiation performance.

The secondary question concerning scenario effects could not be adequately answered because of the program error. However, for both the entire data set and the subset of data, our results indicated little effect for scenario. Where there was an effect, one other factor should be noted: Attorneys' formal training outside of negotiation classes is in competitive, adversarial approaches to resolving disputes. The competitive orientation of this training for lawyers may have been cued more by role-playing in the law scenario than by role-playing a high school student. Thus, the law students may be a somewhat problematic population for testing negotiation skills in a setting requiring integrative negotiation. This adversarial approach to negotiation may also explain the unexpected results regarding the self-serving bias, particularly the finding that the law students were more biased than novices in terms of ratings of cooperation.

In summary, Study 1 offered clear evidence for the construct validity of our simulation approach to measuring negotiation skills. However, the question of effects for different scenarios, and their interaction with different populations, will require further investigation. The use of explicit domain specification in the form of software parameters appears promising.

Specific Hypotheses of Study 2

Hypothesis 6: Three-person groups will perform better than 2-person groups.

Our future R&D plans involve developing assessment measures for groups of students working together in our negotiation context. However, in our context, we did not know the feasibility of students working together. We were also aware of issues due to group composition (Slavin, 1990; Webb, 1993). Our strategy to deal with differences in group composition is to randomly assign students to a group. We believe that the random assignment in an accountability scenario is fair. Moreover, there is some evidence that the number of students affects productivity (Hagman & Hayes, 1986). However, as seen in Table 24, group interaction logically may or may not increase group productivity. Thus, we were also interested in the impact of 2-person versus 3-person groups. In Study 2, we expected 3-person groups to perform better than 2-person groups.

Method (Study 2)

Subjects. Subjects participating as teams were drawn from the same high school as the participants in Study 1. Fifty-one students from business computer courses aimed for non-college bound students participated. Twenty-six of the participants were females and 25 were males. Four of the participants were sophomores, 23 were juniors, and 24 were seniors.

Procedure. The procedure followed was the same as that in Study 1 with one alteration. Rather than working at a computer alone, the subjects were randomly assigned to groups of two or three. The participants were instructed to work together as a team in the negotiation. They were organized in 15 groups of three and 14 groups of two. However, for data analysis, due to missing data, there were a total of 19 groups (6 groups of 2; 13 groups of 3).

Table 24

Summary of the Proposed Functions of Group Interaction

Summary variables postulated as important in affecting performance outcomes	Impact of interaction process on the summary variables	
	(A) Inevitable process losses	(B) Potential for process gains
Member effort brought to bear on the task	Interaction serves as the less-than-perfect means by which member efforts are coordinated and applied to the task	Interaction can serve to enhance the level of effort members choose to expend on task work
Performance strategies used in carrying out the task	Interaction serves as a less-than-perfect 'vehicle' for implementing pre-existing strategies brought to the group by members and (often) shared by them	Interaction can serve as the site for developing or reformulating strategic plans to increase their task appropriateness
Member knowledge and skills used by the group for task work	Interaction serves as a less-than-perfect means for assessing, weighting, and applying member talents to the task	Interaction can serve as a means for increasing the total pool of knowledge and/or skill available to the group (i.e., when the group is the site for generation of new knowledge or skill by members)

Note. Reproduced from Hackman and Morris (1983).

Results (Study 2)

The results offered limited support of the hypotheses in that most differences between groups were in the expected direction but not significant. As seen in Table 25, with respect to the final counteroffer measure of performance, 3-person groups achieved a greater mean value (M = 126.53) than 2-person groups (M = 115.00), but the analysis of variance revealed this difference was not significant. Three-person teams also more frequently concluded the negotiation with actual agreement than did 2-person teams (100% of 3-person teams reached an agreement whereas 66.7% of 2-person teams reached agreement). This difference was significant, (χ^2 = 4.84 , df = 1, p = .03). Three-person teams and 2-person teams did not differ significantly in terms of the quality (integrative vs. distributive) of reached agreements.

Table 25
Groups of 2 and 3—Final Counteroffers

	Mean (*SD*)	*n*
Groups of 2	115.00 (32.09)	6
Groups of 3	126.53 (6.25)	13

The results did not support the hypothesis with respect to the fixed-pie bias. The mean bias for 3-person teams was 0.62 whereas the mean bias for 2-person teams was 1.67. However, analysis of variance revealed that this difference approached significance, $F(1, 17) = 4.53$, $p = .056$. The results did not support the hypotheses with respect to the self-serving biases (or concern, cooperativeness, or reasonableness).

Self-regulation Results (Study 2)

With respect to metacognition (see Table 26 [self-checking] and Table 27 [cognitive strategy]), the groups were equivalent. Further, there were also no significant differences between 2-person and 3-person groups for either worry (Table 28) or effort (Table 29). Thus, with respect to self-regulation in general, there were no differences between 2-person and 3-person groups. In summary, in Study 2 there were minimal or no effects of group size. However, it is clear that a collaborative environment is feasible.

Table 26
Groups of 2 and 3—Self-checking

	Mean (*SD*)	*n*
Groups of 2	2.74 (0.37)	5
Groups of 3	2.65 (0.46)	12

Table 27
Groups of 2 and 3—Cognitive Strategy

	Mean (*SD*)	*n*
Groups of 2	2.82 (0.67)	5
Groups of 3	2.83 (0.46)	12

Table 28
Groups of 2 and 3—Worry

	Mean (*SD*)	*n*
Groups of 2	1.57 (0.36)	5
Groups of 3	1.41 (0.30)	12

Table 29
Groups of 2 and 3—Effort

	Mean (*SD*)	*n*
Groups of 2	2.96 (0.43)	5
Groups of 3	3.00 (0.52)	12

General Discussion

This validation study revealed worthwhile information about the feasibility of the computer simulation approach to measuring negotiation skills.

The primary purpose of our studies has been to determine whether the computer simulation we have developed reliably and validly measures the negotiation subskill of the interpersonal workplace competency (U.S. Department of Labor, 1991, 1992). The most direct test of the simulation's validity has been to see whether the simulation discriminates between expert and novice negotiators. Across all phases and versions of the simulation tested so far, experts' performance has been clearly superior to novices' performance on all measures of negotiation performance in the simulation.

In addition to measures of performance outcome, we have also examined several process variables. We reasoned that if our scenarios were capturing the negotiation context, then students should display cognitive processes similar to those that the literature indicates occur in "real" negotiations. If this was true, then such process information would add to the construct validity of our assessment. Research on negotiation has documented a number of cognitive biases which present obstacles to negotiator performance.

In other words, superior negotiators are less susceptible to the cognitive biases that commonly beset people in negotiation situations. Thus, we have examined the validity of our simulation by assessing the degree to which the absence of known cognitive biases with performance implications is associated with higher negotiation performance on our simulation. Although not as robust as the expert/novice findings, we have consistently found that (a) such biases are associated with lower negotiation performance in the simulation, and (b) experts exhibit more self-regulation skills than novices.

Several other properties of the negotiation simulation as an assessment tool have also been examined. It appears that the simulation is robust to various negotiation scenarios. Specifically, in two scenarios of negotiating a job contract, whether as a high school student with a movie theater manager or as a law student for a job with a law firm, subject performance on the simulation did not vary significantly as a function of scenario. In effect, we have parallel forms of our test.

Next year, we plan to continue to measure self-regulation for both individuals and teams. However, our current performance measures do not capture the group process well. Our major effort in FY94 will be to develop domain-independent measures of teamwork skills such that a score can be assigned to an individual as well as to a team. In summary, our experience in conducting these studies suggests that the simulation approach we have taken is a valid and feasible method of assessing negotiation skills for both individuals and teams.

References

Bazerman, M.H., Magliozzi, T., & Neale, M.A. 1985. Integrative bargaining in a competitive market. *Organizational Behavior and Human Decision Processes, 35*, 294-313.

Brett, J.M., Goldberg, S.B., & Ury, W.L., (1990). Designing systems for resolving disputes in organizations. *American Psychologist, 45*, 162-170.

Carnevale, P.J., & Conlon, D.E. (1988). Time pressure and strategic choice in mediation. *Organizational Behavior and Human Decision Processes, 42*, 111-33.

Carnevale, P.J., & Pruitt, D.J. (1992). Negotiation and mediation. *Annual Review of Psychology, 43*, 531-582.

Glaser, R., Raghavan, K., & Baxter, G.P. (1992). *Design characteristics of science performance assessments* (CSE Tech. Rep. No. 349). Los Angeles: University of California, Center for the Study of Evaluation, Standards, and Student Testing (CRESST).

Green, B.F. (1991). Guidelines for computer testing. In T.B. Gutkin & S.L. Wise (Eds.), *The computer and the decision-making process* (pp. 245-273). Hillsdale, NJ: Lawrence Erlbaum Associates.

Hackman, J.R., & Morris, C.G. (1983). Group tasks, group interaction process, and group performance effectiveness. In H.H. Blumberg, A.P. Hare, V. Kent, & M. Davies (Eds.), *Small groups and social interaction* (Vol. 1, pp. 331–345). New York: John Wiley & Sons.

Hagman, J.D., & Hayes, J.F. (1986). *Cooperative learning: Effects of task, reward, and group size on individual achievement* (ARI Tech. Rep. No. 704). Alexandria, VA: Army Research Institute for the Behavioral and Social Sciences.

Heider, F. (1958). *The psychology of interpersonal relations.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Kelley, H. H. (1979). *Personal relationships: Their structures and processes.* Hillsdale, NJ: Erlbaum.

Kelley, H.H., & Thibaut, J.W. (1978). *Interpersonal relations: A theory of interdependence.* New York: Wiley-Interscience.

Kramer, R., Newton, E., Pommerenke, P. (1993). Self-enhanced biases and negotiator judgment: Effects of self-esteem and mood. *Organizational Behavior and Human Decision Processes, 56*, 110-133.

Millman, J., & Greene, J. (1989). The specification and development of tests of achievement and ability. In R.L. Linn (Ed.), *Educational measurement* (3rd ed., pp. 335-366). New York: Macmillan.

Neale, M.A., & Bazerman, M.H. (1985). The effects of training and negotiator overconfidence on bargainer behavior. *Academy of Management Journal, 28*, 34-44.

Neale, M.A., & Bazerman, M.H. 1991. *Cognition and rationality in organizations.* New York: Free Press.

O'Neil, H.F., Allred, K.G., & Baker, E.L. (1992a). *Measurement of workforce readiness competencies: Design of prototype measures* (CSE Tech. Rep. No. 344). Los Angeles: University of California, Center for Research on Evaluation, Standards, and Student Testing (CRESST).

O'Neil, H.F., Allred, K.G., & Baker, E.L. (1992b). *Measurement of workforce readiness: Review of theoretical frameworks* (CSE Tech. Rep. No. 343). Los Angeles: University of California, Center for Research on Evaluation, Standards, and Student Testing (CRESST).

O'Neil, H.F., Jr., Allred, K., & Dennis, R. (1992). *Simulation as a performance assessment technique for the interpersonal skill of negotiation* (Deliverable to OERI, Contract No. R117G10027). Los Angeles: University of California, Center for Research on Evaluation, Standards, and Student Testing.

O'Neil, H.F., Jr., Sugrue, B., Abedi, J., Baker, E.L., & Golan, S. (1992). *Report of experimental studies on motivation and NAEP test performance* (Report to National Center for Education Statistics, Contract No. RS90159001). Los Angeles: University of California, National Center for Research on Evaluation, Standards, and Student Testing.

Pruitt, D.G., & Rubin, J.Z. (1986). *Social conflict: Escalation, stalemate, and settlement.* New York: Random House.

Pruitt, D. G., & Syna, H. (1984). Successful problem solving. In D. Tjosvold & D. W. Johnson (Eds.), *Productive conflict management: Perspective for organizations* (pp. 129-148). New York: Irvington.

Rahim, M.A. (1986). *Managing conflict in organizations.* New York: Praeger.

Raiffa, H. (1982). *The art and science of negotiation.* Cambridge, MA: Belknap Press/Harvard University Press.

Rubin, J., & Brown, B.R. (1975). *The social psychology of bargaining and negotiation.* New York: Academic Press.

Sillars, A. L. (1981). Attributions and interpersonal conflict resolution. In J.H. Harvey, W. Ickes, & R.F. Kidd (Eds.), *New directions in attribution*

research (Vol. 3, pp. 279-305). Hillsdale, NJ: Lawrence Erlbaum Associates.

Slavin, R.E. (1990). *Achievement effects of ability grouping in secondary schools: A best-evidence synthesis.* Madison: University of Wisconsin, National Center on Effective Secondary Schools.

Thompson, L.L. (1990a). The influence of experience on negotiation performance. *Journal of Experimental Social Psychology, 26,* 528-544.

Thompson, L.L. (1990b). Negotiation: Empirical evidence and theoretical issues. *Psychological Bulletin, 108,* 515-532.

Thompson, L.L. (1991). Information exchange in negotiation. *Journal of Experimental Social Psychology, 27,* 161-179.

Thompson, L.L., & Hastie, R.M. (1990). Social perception in negotiation. *Organizational Behavior and Human Decision Processes, 47,* 98-123.

Tjosvold, D. (1990). The goal interdependence approach to communication in conflict: An organizational study. In M.A. Rahim (Ed.), *Theory and research in conflict management* (pp. 15-31). New York: Praeger.

Tjosvold, D., & Johnson, D. W., (1983). *Productive conflict management.* New York: Irvington Publishers.

U.S. Department of Labor. (1991, June). *What work requires of schools: A SCANS report for America 2000.* Washington, DC: U.S. Department of Labor, Secretary's Commission on Achieving Necessary Skills.

U.S. Department of Labor. (1992). *Skills and tasks for jobs: A SCANS report for America 2000.* Washington, DC: U.S. Department of Labor, Secretary's Commission on Achieving Necessary Skills.

Walton, R.E., & McKersie, R. E. (1965). *A behavioral theory of labor negotiations.* New York: McGraw-Hill.

Webb, N. (1993). *Collaborative group versus individual assessment in mathematics: Processes and outcomes* (CSE Tech. Rep. No. 352). Los Angeles: University of California, Center for the Study of Evaluation, Standards, and Student Testing (CRESST).

Weiner, B. (1986). *An attributional theory of motivation and emotion.* New York: Springer-Verlag.

Womack, D.F. (1990). Applied communications research in negotiation: Implications for practitioners. In M.A. Rahim (Ed.), *Theory and research in conflict management* (pp. 32-53). New York: Praeger.

Appendix 1

The Law Firm Scenario

Subjects were instructed that the job contract negotiation centered on three issues: (a) the annual salary the law student would be paid, (b) the number of months to become a partner in the firm, and (c) the number of billable hours the law student would be required to log per year. Subjects were told that they preferred a higher salary, fewer months to make partner, and fewer billable hours required, whereas the law firm preferred a lower salary level, a longer time to partnership, and more billable hours. Subjects were also instructed that the parties would exchange proposals in the negotiation in trying to reach agreement on one proposal level for each issue.

The subjects were also instructed with respect to their relative priorities on the three issues. The subjects were told that because the law student had incurred substantial student loans, salary was most important to him/her. Because the law student was willing to work hard to earn a higher salary, billable hours was least important to the him/her. The subjects were also instructed that the months to partnership was of intermediate importance. The issue chart presented on the computer screen, as seen in the table below, represented these relative preferences in that the highest points attainable were on the salary issue, followed by the months to partnership and the billable hours issues respectively. The law firm representative's priorities were offsetting, as shown in Table A-1.

Table A-1

Law Student and Law Firm Representative Issue Chart of Point Values

Issues		
Salary	Months to partnership	Billable hours
Law student		
A 120	A 80	A 40
B 105	B 70	B 35
C 90	C 60	C 30
D 75	D 50	D 25
E 60	E 40	E 20
F 45	F 30	F 15
G 30	G 20	G 10
H 15	H 10	H 5
I 0	I 0	I 0
Law firm representative		
A 0	A 0	A 0
B 5	B 10	B 15
C 10	C 20	C 30
D 15	D 30	D 45
E 20	E 40	E 60
F 25	F 50	F 75
G 30	G 60	G 90
H 35	H 70	H 105
I 40	I 80	1 120

Appendix 2
Questionnaire for Studies 1 and 2*

1. How concerned with YOUR interests was the OTHER PARTY in the negotiation?

   A Totally CONCERNED
   B Extremely CONCERNED
   C Quite CONCERNED
   D Moderately CONCERNED
   E Mildly CONCERNED
   F Hardly CONCERNED
   G Not at all CONCERNED

2. How concerned with the OTHER PARTY'S interests were YOU in the negotiation?

   A Totally CONCERNED
   B Extremely CONCERNED
   C Quite CONCERNED
   D Moderately CONCERNED
   E Mildly CONCERNED
   F Hardly CONCERNED
   G Not at all CONCERNED

3. How cooperative or competitive was the OTHER PARTY in the negotiation?

   A Extremely COMPETITIVE
   B Moderately COMPETITIVE
   C Mildly COMPETITIVE
   D Neither COMPETITIVE nor COOPERATIVE
   E Mildly COOPERATIVE
   F Moderately COOPERATIVE
   G Extremely COOPERATIVE

4. How cooperative or competitive were YOU in the negotiation?

   A Extremely COMPETITIVE
   B Moderately COMPETITIVE
   C Mildly COMPETITIVE
   D Neither COMPETITIVE nor COOPERATIVE
   E Mildly COOPERATIVE
   F Moderately COOPERATIVE
   G Extremely COOPERATIVE

5. How reasonable or fair were the OTHER PARTY's recommendations in the negotiation?

   A Extremely UNREASONABLE
   B Moderately UNREASONABLE
   C Mildly UNREASONABLE
   D Neither UNREASONABLE nor REASONABLE
   E Mildly REASONABLE
   F Moderately REASONABLE
   G Extremely REASONABLE

6. How reasonable and fair were YOUR recommendations in the negotiation?

   A Extremely UNREASONABLE
   B Moderately UNREASONABLE
   C Mildly UNREASONABLE
   D Neither UNREASONABLE nor REASONABLE
   E Mildly REASONABLE
   F Moderately REASONABLE
   G Extremely REASONABLE

7. What issue do you think was most important to the OTHER PARTY in the negotiation?

   A Passes
   B Weekend Hrs
   C Wage

8. What issue do you think was the least important to the OTHER PARTY in the negotiation?

   A Passes
   B Weekend Hrs
   C Wage

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* Note. Questions 1 and 3 were scored A=7, B=6, C=5, etc., whereas Questions 3, 4, 5, and 6 were scored A=1, B=2, C=3, etc. Questions 7 and 8 were not analyzed.

Appendix 3
Self-Regulation Questionnaire

Self-Assessment Questionnaire

Directions: A number of statements which people have used to describe themselves are given below. Read each statement and indicate how you thought or felt during the task. Find the word or phrase which best describes how you thought or felt and circle the number for your answer. There are no right or wrong answers. Do not spend too much time on any one statement. Remember, give the answer which seems to describe how you thought or felt during the task.

	Not at All	Somewhat	Moderately So	Very Much So
1. I was afraid that I should have studied more for this task.	1	2	3	4
2. I concentrated fully when taking the task.	1	2	3	4
3. I checked my work while I was doing it.	1	2	3	4
4. I tried to understand the goals of the task questions before I attempted to answer.	1	2	3	4
5. I felt that others would be disappointed in me.	1	2	3	4
6. I worked as hard as possible.	1	2	3	4
7. I thought everybody else studied more than I.	1	2	3	4
8. I corrected my errors.	1	2	3	4
9. I tried to determine what the task required.	1	2	3	4
10. I thought my score was bad, so everybody including myself would be disappointed.	1	2	3	4
11. I put forth my best effort.	1	2	3	4
12. I was aware of the need to plan my course of action.	1	2	3	4
13. I almost always knew how much of the task I had left to complete.	1	2	3	4
14. I made sure I understood just what had to be done and how to do it.	1	2	3	4
15. I felt regretful.	1	2	3	4
16. I kept working, even on difficult task questions.	1	2	3	4
17. I wasn't happy with my performance.	1	2	3	4
18. I kept track of my progress and, if necessary, I changed my techniques or strategies.	1	2	3	4
19. I determined how to solve the task questions.	1	2	3	4
20. I was concerned about what would happen if I did poorly.	1	2	3	4
21. I tried to do my best on the task.	1	2	3	4
22. I checked my accuracy as I progressed through the task.	1	2	3	4
23. I tried to understand the task questions before I attempted to solve them.	1	2	3	4