Assessing the Effects of Motivative Augmentals, Pay-for-Performance, and Implicit Verbal Responding on Cooperation

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Abstract

Motivative augmentals are rules or statements that temporarily change the effectiveness of a consequence, similar to establishing operations for nonverbal consequences (Hayes, Barnes-Holmes, & Roche, 2001). Many communications by an organization's leadership may function as such and alter the function of stimuli in the workplace, which in turn may influence employee behaviors (Houmanfar & Rodrigues, 2012). There is a lack of experimental research regarding this, however, particularly under different organizational pay systems (i.e., financial contingencies), which have been repeatedly shown to influence performance (e.g., Gupta & Shaw, 1998; Locke, Feren, McCaleb, Shaw, & Denny, 1980). The current study sought to compare the two by measuring the effect of motivational statements on individual versus cooperative responding under two different pay-for-performance contingencies in an organizational analogue. Stimuli for the motivational statements were selected utilizing an Implicit Relational Assessment Procedure (IRAP) with one group of participants, and these statements were then tested under piece-rate and profit-share conditions with a second group of participants in a counterbalanced reversal design. Results indicated that the financial contingencies had more of an effect on responding, but that motivational statements influenced behavior as well. In particular, motivational statements affected whether a participant chose to cooperate or behave individually more under financially neutral conditions (i.e., profit share) when there was no financial cost for doing so. As such, organizations can utilize memos or speeches to increase performance, but it is important for the content to align with financial contingencies in order to maximize performance.

Keywords: motivative augmentals, pay-for-performance, implicit relational assessment procedure, rules, cooperation, relational frame theory

One of the primary means of influencing employee behavior and productivity involve consequential manipulations, in particular performance-based pay. Some of the most common examples of payment systems are hourly, piece rate, gain sharing, and profit sharing (Abernathy, 2000, 2008, 2009). In general, payment systems are classified as a type of fixed compensation, such as hourly or salary, or a variable pay system, which is generally termed pay-for-performance (e.g., Bucklin & Dickinson, 2001). Although the more traditional hourly or salary system is the most common form of pay, it has been argued throughout the literature that the closer the tie between behavior and the financial consequence, the higher the likelihood of improved performance (e.g., Abernathy, 2000, 2009; Gupta & Shaw, 1998; Kahn & Sherer, 1990; Locke et al., 1980). For example, in a piece-rate system, the individual earns a certain amount of money for each item completed. This can be awarded for every item completed above a certain amount, in an accelerating or decelerating percentage, as a percentage in addition to base pay or strictly as a per-piece amount (see Bucklin & Dickinson, 2001).

Piece rate is just one example of a performance pay system, however, and suffers from a number of limitations. First, piece rate is highly specific to one behavior and as such can only be applied in certain organizational settings, such as a manufacturing company that utilizes assembly lines (Lawler, 1990). Other companies that do not have performance measures that are frequently repeated and easily quantified are not recommended (see discussion by Abernathy, 1996). In addition, because only one form of behavior is receiving the financial reinforcer, other behaviors that are not reinforced, such as cooperating or helping other coworkers, may decrease

(Abernathy, 2000; Beer & Cannon, 2004; Lawler, 1990; Rynes, Gerhart, & Parks, 2005). This is consistent with the research literature on choice that indicates how individuals will allocate their responding to the task (i.e., choice) associated with higher rates of reinforcement (Fisher & Mazur, 1997). In the current example, working individually has a higher rate of monetary reinforcement than helping a coworker, which is associated with no monetary reinforcement. Profit share is one alternative that can ameliorate some of these concerns. One advantage to profit share is that it is linked to the profitability of the company (Abernathy, 2000; Bucklin & Dickinson, 2001). This arrangement allows individuals to work with others and receive some financial benefit because everyone succeeding improves the performance of the company and therefore increases their financial payment. Profit-share systems can be somewhat complicated, however, and maintaining a clear line of sight for the employee to see how their behavior is affecting their payment is critical (Weitzman & Kruse, 1990).

Maglieri (2007) systematically compared productivity under hourly, piece-rate, and profit-share conditions, and found that productivity was higher under piece-rate and profit-share conditions relative to hourly pay. However, results also showed that cooperation (as an alternative to individual responding) was much lower in piece rate conditions when participants lost the opportunity to earn more money if they helped a simulated partner. Cooperation and other more obscure and difficult-to-measure behaviors are challenging to compensate financially, and it is important to consider other interventions to increase their probability.

Antecedent Interventions: Organizational Messages and Their Content

An alternative approach would be to examine how antecedent interventions may increase cooperation and other pro-social behaviors. Antecedent interventions in the workplace are designed to communicate desired behavior (Daniels & Bailey, 2014, p. 126). These interventions

may include, but are not limited to, corporate communication documents, goals, objectives, job descriptions, policies, and procedures. Indeed, there are published recommendations for managers on how to design a motivating speech (Filson, 1991). Although organizational messages are frequently utilized, however, their effect along with other antecedent interventions, may be limited (see discussion by Daniels & Bailey, 2014, pp. 130–132). Further research is needed regarding how to increase the effectiveness of these antecedent-based interventions.

One aspect of organizational messages that may be particularly important is the content. Although the overall message may need to be specific to the issue of concern (e.g., better customer service), word choice or how a message is phrased may have significant effects on employee behavior. One study found that an increase in motivating language, defined by the authors as direction giving, empathetic, and meaning making, was related to a 2% increase in worker performance (Mayfield, Mayfield, & Kopf, 1998). Although these results were based on correlated self-report measures, it does indicate that content of the message may relate to changes in performance. In organizational settings in particular, messages may be delivered to a large number of individual employees and maximizing their effects for employees with diverse behavioral histories can be challenging. According to Kantor (1982), institutional stimuli are those that correspond to a shared response from a group, or in other words, a collectivity of individuals that respond to the stimuli in a similar manner. It is inefficient and unlikely that an organization would want to personalize their messages to individual employees (in particular for large organizations). One possibility is to assess employees' history of responding with respect to different content variations and, subsequently, choose the content (institutional stimuli) that appears to have the greatest positive, or desirable, stimulus function for the group of employees.

Responding to the content of a message could be considered a form of verbal behavior. Relational Frame Theory (RFT) is a behavior analytic account of language and cognition suggesting that verbal behavior involves arbitrarily applicable relational responding (Hayes et al., 2001). A relational response is a response to one stimulus based on its relation to another stimulus. What makes verbal behavior (i.e., language) unique is that this relational response can occur independent of physical features of the stimulus, thereby making the relational response arbitrary. In an organizational context, if an individual engages in a more positive relational response to a particular stimulus (e.g., the word "teamwork") relative to another (e.g., "helping") than their performance may be more likely to change when using that particular content in a speech or memo.

Recent methodology has allowed for the assessment of these relational responses (i.e., verbal behavior) through computer-based programs (e.g., the Implicit Association Test [IAT]; Greenwald, McGhee, & Schwartz, 1998). A variation of this methodology, the Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes, Barnes-Holmes, Stewart, & Boles, 2010), has been developed within the functional, behavior analytic tradition. The IRAP (and other variations) has a distinct advantage because the rapid responding makes it difficult to fake results (McKenna, Barnes-Holmes, Barnes-Holmes, & Stewart, 2007; but see also Hughes et al., 2016), unlike explicit self-report measures that may suffer from falsified answers (i.e., lying).

A recent study (Jackson et al., 2016) utilized the IRAP to determine whether participants demonstrated a stronger implicit relational response to verbal stimuli pertaining to health or aesthetic characteristics of exercise. The results for each participant were then used to create individualized motivational statements that were delivered at various times during a spinning cycling class. The performance of participants during the exercise class, measured by ability to

maintain an elevated heart rate similar to that of the instructor, was compared during classes in which participants received either individualized motivational statements or neutral statements that were used for control purposes. Results showed that participants' performance was greater when receiving the individualized motivational statements relative to the neutral statements. The authors suggested that these individualized statements functioned as verbal motivating operations, otherwise known as motivative augmentals (Hayes et al., 2001).

Organizational Messages as Motivative Augmentals

Rules may function as either augmentals, tracks, or plys (see Hayes et al., 2001, pp. 108–110 for further details). Motivative augmentals are defined as verbal statements that have the effect of temporarily increasing the value of reinforcers specified within the rule, as well as operant behavior that may produce those reinforcers. Statements issued by a manager such as "our competitor is selling so many more phone plans than we are" may temporarily increase the value of achieving sales for the week, and increase behaviors (e.g., phone calls) that may produce increased sales. This is in contrast to a track, which is a rule that describes a contingent behavior–consequence relationship in which the consequence is not mediated or delivered by the rule giver, but rather is a naturally occurring consequence based on the occurrence of the specified behavior in a given context. For example, hourly pay is usually delayed and is provided in the form of a paycheck. So, an individual may operate under the rule "if I work 8 hours a day, 5 days a week, at $10.00 an hour, I will earn $400.00 this week" and behave according to that rule (e.g., come to work and stay the full 8 hours) until they are paid at the end of the week. Pliance is a rule that describes the behavior–consequence relationship, but the consequence is mediated or delivered by the rule-giver. An employee may state the rule "the supervisor will be

happy with me if I complete this project on time" and that behavior is reinforced by the supervisor expressing approval upon timely completion.

Whether or not organizational messages may function as motivative augmentals, similar to what Jackson et al. (2016) found in a workout class, is primarily speculative. For example, in a motivational speech certain content is recommended to "inspire" employees, but the business community has noted, though not empirically, the temporary effects these speeches may have (Roos, 2013). Alternatively, some research suggests that verbal statements (i.e., instructions) may result in a lack of sensitivity to changes in schedules of reinforcement (e.g., Kaufman, Baron, & Kopp, 1966), but not necessarily when inaccurate instructions cause individuals to contact a monetary loss (Galizio, 1979). If this is the case, it may be that these rules function more as tracks, and when the description of behavior–environment relationships is found to be inaccurate (i.e., the individual follows the rule and loses money), the rule and/or performance is revised accordingly. Financial consequences may also result in a lack of sensitivity to rules. In a recent anecdotal, high-profile case, employees at Wells Fargo Bank opened millions of fake bank accounts at the expense of customers. This was in response to a piece-rate incentive program that reinforced opening new accounts. It is likely that while this program was in place, Wells Fargo also provided messages and memos emphasizing the importance of customer satisfaction and good customer service. However, it would seem in the case of Wells Fargo that the programmed incentive contingencies exerted greater control over employee behavior than did any communication aimed at promoting customer service behaviors. Indeed, multiple leaders in the field of organizational behavior management have written about the primary importance of consequences for employee behavior (e.g., Daniels & Bailey, 2014) and financial consequences

in particular (Abernathy, 1996). Regardless, how these organizational messages influence responding under different financial contingencies requires further exploration.

To this end, the purpose of the present study was to examine the effect of IRAP-determined messages (similar to Jackson et al., 2016) on employee performance under different pay-for-performance contingencies in an analogue setting. In the first experiment, the IRAP was utilized to identify stimuli that evoked a strong positive relational response, on average, for a group of participants. These stimuli were then incorporated into organizational motivational statements for the second experiment. In Experiment 2, a different group of participants were exposed to the motivational statements and how they chose to allocate their work (cooperatively or individually) during an organizational analog work task involving different pay-for-performance systems (i.e., piece rate and profit sharing) was measured.

Experiment 1

Method

Participants and setting. Participants for Experiment 1 were 11 undergraduate students. All sessions were conducted in two small laboratory rooms on a university campus, both of which contained desktop PC computers.

Experimental procedure. A modification of the standard IRAP preparation, known as the Mixed-Trial IRAP (MT-IRAP; Levin, Hayes, & Waltz, 2010) was utilized to assess participants' responding to specific target stimuli within the "cooperative" and "individual" stimulus categories. Stimuli for each category were selected by generating a list of synonyms using a thesaurus and other online tools. The cooperative category included stimuli such as partnership, group effort, and alliance, and the individual category included words such as autonomy, on my own, and independent (see Table 1). In addition to the target stimuli,

evaluative stimuli (“good”, “bad”) were also presented on screen, as were the response option stimuli of “same” and “different,” which participants responded to with a respective keyboard key press. See Appendix for example.

Table 1.

Target, Evaluative, and Response Option Stimuli for both IRAPs

Target Stimuli: Cooperative	Target Stimuli: Individual	Evaluative Stimuli	Response Option Stimuli
Alliance	Autonomy	Good	Same
Cohesive effort	Do things my way	Bad	Different
Considerate of others	Flying solo		
Group effort	Independent		
Partnership	Loner		
Support others	On my own		
Team player	Self-reliant		
Work out compromise	Survival of the fittest		

Participants were instructed to respond as quickly and accurately as possible to various combinations of the aforementioned stimuli by pressing a keyboard key that corresponded to one of the two response options (same, different). The primary data were key-press response latencies recorded for each trial, which were compared across different combinations of stimulus presentations in order to assess participants’ speed and accuracy of responding to the verbal stimuli. For example, when presented with the stimuli “teamwork” and “good,” if a participant emitted the response “same” faster, on average, than when responding “different,” then it would suggest the participant's brief and immediate relational response to teamwork is that it is the same as good, rather than bad. Brief and immediate relational responses (BIRRs) are distinguished from extended and elaborated relational responses (EERRs) when an individual

has unlimited time to answer the question "is teamwork good or bad" as one would see in a survey (see Barnes-Holmes et al., 2010, for further elaboration on the Relational Elaboration and Coherence [REC] model). Participants were also presented with one additional stimulus on the screen, which instructed them to switch their responding to the opposite response. Using the previous example, to indicate that "teamwork" and "good" are "different." In the standard IRAP, this is done in alternating blocks of trials, but in the MT-IRAP, this is done trial-by-trial through the use of this additional stimulus (i.e., "truth" and "lie"), hence the name Mixed-Trial IRAP (see Levin et al. for a more detailed discussion). According to Barnes-Holmes et al. (2010), results from the IRAP demonstrate a history of verbally relating specific classes of stimuli. The addition of the "truth" and "lie" stimulus requires participants to engage in a response that is inconsistent with their prior learning history and what their brief and immediate relational response to the stimulus combination would be. This lack of coherence of their immediate relational response to the stimulus combination should result in slower response times and as such, the difference in response latencies between consistent (truth) and inconsistent (lie) trials indicates the strength and direction (positive or negative) of the relational response. If the participant has shorter response latencies to identifying "teamwork" and "good" as the "same" under consistent (truth) trials and longer response latencies under inconsistent (lie) trials, this would indicate a history of verbally relating "teamwork" as "good."

The MT-IRAP also began with a practice phase to familiarize participants with the procedure and to ensure participants could effectively interact with the assessment. In order to complete the practice phase and proceed to the test phase, participants had to complete the practice trials with an average accuracy of 70% or greater and average response latency of 3 seconds or less.

Results

Response latencies were analyzed using the standard D-algorithm (see Barnes-Holmes et al., 2010), which produced a D-IRAP score that was essentially a Cohen's *d* effect size (Cohen, 1988). Data were analyzed for each individual stimulus, as opposed to combined lists of stimuli (i.e., all individual stimuli or all cooperative stimuli), which is a benefit of the MT-IRAP version of the assessment (see Levin et al., 2010, for a discussion). D-IRAP scores were organized into categories of effect size as follows: strong effect (< -.8 and > .8), medium effect (-.5 to -.8 or .5 to .8), small effect (-.21 to -.49 or .21 to .49) and neutral or no effect (-.2 to .2). These effect sizes indicate the strength and direction (positive or negative) of the relational response to the stimulus.

Table 2 includes the number of participants per stimulus who demonstrated strong, medium, small, and no (neutral) effects. The table also includes the number of participants per stimulus whose error rates were too high to be included in the results (i.e., stimuli with accuracy rates of 65% or less). There were consistently higher error rates with the individual stimuli than with the cooperative stimuli. Planned one-sample *t*-test analyses were conducted to test whether IRAP scores for specific stimuli were significantly different from 0, and results indicated that 4 of the 8 individual stimuli (i.e., autonomy, independent, on my own, self-reliant) and 5 of the 8 cooperative stimuli (i.e., cohesive effort, considerate of others, group effort, partnership, team player) were statistically significant ($p < .05$, Table 3).

Table 2.

Number of participants per stimulus that exhibited strong, moderate or weak positive or negative relational responses, neutral responses, and error rates too high for consideration.

		Strong Pos. (.8>)	Mod. Pos. (.5-.8)	Weak Pos. (.2-.5)	Neut. (neg.2 -.2)	Weak Neg. (neg.2-.5)	Mod. Neg. (neg.5-.8)	Strong Neg. (neg.8>)	Errors (<65% correct)
Cooperative Stimuli	Alliance	1	2	1	3	3	0	0	1
	Cohesive effort**	4	3	1	2	0	1	0	0
	Considerate of others*	1	3	3	3	1	0	0	0
	Group effort*	4	1	2	3	0	0	0	1
	Partnership**	4	1	3	3	0	0	0	0
	Support others	0	1	4	5	1	0	0	0
	Team player*	2	3	3	1	1	1	0	0
	Work out compromise	2	1	1	6	1	0	0	0
Individual Stimuli	Autonomy*	3	1	1	0	1	0	0	5
	Do things my way	2	0	4	1	0	2	2	0
	Flying solo	1	3	1	3	1	0	0	2
	Independent**	2	2	3	1	2	0	0	1
	Loner	0	1	0	0	2	1	2	5
	On my own*	4	2	3	0	0	0	0	2
	Self-reliant**	2	3	2	2	0	1	0	1
	Survival of the fittest	3	2	1	0	2	1	0	2

Note. *indicates statistical significance at the .05 level and ** indicates selected for study based on minimal errors and strong/moderate positive relational responses to stimuli (.5 or above).

Table 3.

Results of Planned One-Sample T-test Analyses of IRAP Scores for Individual and Cooperative Stimuli

Cooperative Stimuli	*n*	*M*	*SD*	*t*	*p*	Individual Stimuli	*n*	*M*	*SD*	*t*	*p*
Alliance	10	0.20	0.20	1.30	.23	Autonomy	6	0.80	0.71	2.76	.04
Cohesive effort	11	0.57	0.56	3.37	.007	Do things my way	11	-0.03	0.75	-0.11	.91
Considerate of others	11	0.35	0.40	2.94	.02	Flying solo	9	0.29	0.55	1.59	.15
Group effort	10	0.47	0.48	3.12	.01	Independent	10	0.39	0.45	2.72	.02
Partnership	11	0.58	0.56	3.44	.006	Loner	6	-0.80	1.01	-1.95	.11
Support others	11	0.15	0.32	1.62	.14	On my own	9	0.84	0.55	4.57	.002
Team player	11	0.37	0.48	2.53	.03	Self-reliant	10	0.43	0.48	2.80	.02
Work out compromise	11	0.30	0.51	1.97	.08	Survival of the fittest	9	0.31	0.64	1.48	.18

Note. Those participants per stimulus whose error rates were too high to be included in the results (i.e., stimuli with accuracy rates of 65% or less), were excluded, hence the variation in *sample size*. Comparison value for all *t*-tests (k) = 0.

Of the stimuli that exhibited a statistically significant effect, two from each category were chosen for use in Experiment 2. Stimuli were selected based on the number of participants who demonstrated a positive relational response to the stimuli (i.e., a stronger IRAP effect with respect to the “good” evaluative stimulus, relative to the strength of the effect with the “bad” evaluative stimulus), and those stimuli which had relatively few error rates among participants. Based on these criteria, the stimuli “independent” and “self-reliant” were selected for the

individual category and “partnership” and “cohesive effort” were selected for the cooperative category. These stimuli were then incorporated into motivational statements to assess their effect on individual and cooperative responding by participants in the second experiment.

Experiment 2

Method

In Experiment 2, participants first completed a standard IRAP (Barnes-Holmes et al., 2010), which consisted of the same individual and cooperative stimuli utilized in Experiment 1 (see Table 1). Based on their individual results, participants were then assigned to one of two experimental groups, such that participants who demonstrated either implicit relational response (i.e., pro-individual or pro-cooperative) were evenly distributed across both groups to the extent possible. Both experimental groups consisted of 10 participants and each was exposed to a specific reversal sequence of phases as described below. A flow-chart for Experiment 2 procedures can be seen in Figure 1.

[Figure 1 here]

Participants and setting. Experiment 2 was conducted with 20 additional undergraduate students who did not participate in Experiment 1. All sessions were conducted in two small laboratory rooms on a university campus, both of which contained desktop PC computers.

Part 1. IRAP. Participants completed the Implicit Relational Assessment Procedure (IRAP) as described in detail by Barnes-Holmes et al. (2010). This version of the IRAP incorporated the same target (individual, cooperative) and evaluative (good, bad) stimuli as the MT-IRAP in Experiment 1 and followed similar procedures. As mentioned previously, however, the standard IRAP instructs participants to respond in a particular manner (pro-individual or pro-cooperative) at the beginning of each block of trials, rather than trial-by-trial using additional

stimuli (e.g., "truth" and "lie"). In particular, this IRAP was programmed with the hypothesis that people are generally pro-cooperative. In other words, stimuli associated with cooperating or helping others were assigned to the “good” category, whereas behaving alone or without the help of others were assigned to the “bad” category. This hypothesis was tested through presenting a series of trials in which participants were asked to respond consistent with the proposed hypothesis, followed by a block of trials in which participants were asked to respond inconsistently. Participants were not informed, however, of the hypothesis or of the groups to which the stimuli were assigned. If answers were correct, the next trial was immediately presented. If answers were incorrect the response was consequated with a red “X” and the participant had to answer correctly before moving on to the next trial. There were 6 blocks of 24 trials each presented, beginning with consistent and then alternating consistent with inconsistent blocks. An instruction screen was presented between blocks of trials telling the participant to reverse their responses based on whether the previous block was consistent or inconsistent.

D-IRAP scores were calculated for the response latencies as described in Experiment 1. As mentioned previously, results of the IRAP determined participant assignment to the two experimental reversal sequences. The sorting of participants was to control for preexisting implicit relational responses with regard to behaving individually or cooperatively, as measured by the IRAP.

Part 2. Data entry task. Approximately one week after completing the IRAP assessment, participants returned to the laboratory to complete an analog data entry task in one of the two experimental sequences.

Dependent variables. The primary measure for the analog data entry task was the proportion of responses allocated to individual or cooperative response options. Participants

could choose to work for themselves or to help a fictitious partner by correcting their errors. This analogue was intended to approximate a workplace environment where people may be compensated for completing their own work or helping their coworkers (see "Experimental Procedure," below, for further detail). Frequency, accuracy, and duration of responses for the data entry task were also evaluated as secondary measures.

Experimental design and independent variables. The first group was exposed to an ABABCDCD reversal sequence of phases. The A phase approximated a piece-rate, pay-for-performance contingency within the analog data entry task, during which individual responding was reinforced when the work task was completed correctly and cooperative responding was not reinforced (see "Experimental Procedure," below, for more detail). Phase B consisted of a profit-share, pay-for-performance contingency within the same data entry task, in which both individual and cooperative responding were reinforced when the work task was completed correctly. In phase C, the profit-share contingency carried over from the final B phase, such that individual and cooperative responding were both reinforced, and motivational statements encouraging individual (as opposed to cooperative) responding were introduced. Phase D included the same profit share contingency and neutral (i.e., nonmotivational) statements were introduced.

The second group of participants was exposed to the reversal sequence of phases BABAEFEF, in which phases A and B were the same as described above (piece rate and profit share, respectively). In the E phase, the piece-rate contingency from the final A phase carried over, such that only individual responding was reinforced, and motivational statements encouraging cooperative responding were introduced. In the F phase, the same piece-rate

contingency remained in place and only neutral, nonmotivational statements were presented to participants.

The two experimental sequences were used to evaluate both increasing and decreasing cooperative responding under financial contingencies commonly found in a naturalistic work environment. In particular, the ABAB and BABA sequences were used to gain initial control by the financial consequences over individual and cooperative responding. The final four phases of the ABABCDCD reversal were included to determine the effects of pro-individual motivational statements on suppressing cooperation, despite being equally compensated (i.e., profit share) for both individual and cooperative responding. The final four phases of the BABAEFEF reversal were included to determine the effect of pro-cooperative motivational statements on increasing cooperation, despite a financial cost (i.e., piece-rate contingency for individual responding only) for doing so.

Experimental procedure. Before beginning the testing portion of the data entry task, participants were exposed to practice trials to control for practice effects and to ensure contact with the financial contingencies as specified below. Participants also completed a survey to verify contact with and accurate identification of the financial contingencies. Following the practice and survey, participants began the experiment, with each phase (A, B, C, etc.) consisting of 6, 2-minute work intervals, which amounted to approximately 96 minutes in sum to complete this portion of the study.

The analog data entry task was designed to simulate a medical record processing task, based on an actual medical data entry job. The task was presented on a computer screen and contained various pieces of personal information of fictitious medical patients, including the patient's name, date of birth, age, gender, patient ID number, heart rate measurement, and QT

interval (a metric of heart rhythm). The actual task consisted of choosing between radio button options that categorized a patient's QT interval, for example, as either below average, average, or above average, based on certain factors such as age, gender, and QT interval. Participants had to reference the individual patient data against the categorical response options and select one option. Participants had to make two such responses for each trial and then click the "Submit" button in order to complete the trial (see Appendix for a screenshot of the data entry task).

Prior to the beginning of each trial, before the fictitious patient information appeared, participants had to choose to behave individually or cooperatively by clicking on one of two buttons ("work alone" or "fix partner's errors," respectively) on the screen. When participants clicked the individual button, the fictitious patient information appeared on the screen and the two response options were blank (i.e., none of the options were preselected), requiring participants to emit the response options before submitting the completed medical record. Participants were informed that when they chose to work cooperatively, they would be fixing a partner's errors, which consisted of the fictitious patient's information appearing on screen and the response options having already been prepopulated, with at least one of the two options being incorrect. Errors were highlighted with a red border, and these had to be fixed by participants before submitting the medical record in order for it to be counted as correct. When working cooperatively, only one error needed to be fixed on approximately 50% of trials, and two errors required fixing on the remaining trials.

Participants received feedback after each record they submitted, with a large red "X" appearing in the middle of the screen following the submission of an incorrect record. Submitting records correctly was reinforced with $0.02, based on the current experimental phase, and earnings were tracked on screen with a cumulative counter so that participants knew how

much they had earned. In particular, phase A was a piece rate contingency in which every correct record submitted when working individually was reinforced with $0.02. However, any correct medical records submitted when working cooperatively were not reinforced. In contrast, during phase B, submitting records was reinforced based on a profit share contingency, in which working individually or cooperatively was reinforced with $0.02 for each correct record. Based on pilot data, $0.02 per correct record approximated a payout of $8.00 per hour, which was comparable to minimum wage at the time of the study. In order to help the programmed contingencies gain differential control over participant responding, the background color of the computer screen alternated in conjunction with the financial contingencies, with all piece rate phases having a red background and all profit share phases a blue background. At the end of each 2-min work session, a feedback screen was presented, which informed participants of how many individual, cooperative, and total records were completed correctly, and how much money was therefore earned during that work session.

As mentioned previously, the "partner" involved in the cooperative trials was a hypothetical partner. The data entry task computer program automatically populated each medical record with at least one error when a participant chose to work cooperatively, so no human partner was required to commit actual errors for these trials. In order to make the hypothetical partner more believable, certain procedures were implemented at the beginning of each participant's experimental session, such as the researcher stating she was going to check with the participant's partner in another laboratory room down the hallway, and then opening and closing doors and simulating an instructional conversation with the hypothetical partner.

Following the first four phases of each experimental sequence, participants were exposed to the final four phases of their respective sequence of phases. During the CDCD and EFEF

phases, participants were presented with a message in the middle of the screen at the beginning of each phase. Participants had to click on the message to begin the data entry task, at which time the message moved to the top of the screen and remained present for the duration of the phase. The motivational statements for phases C and E were developed using the individual and cooperative stimuli identified using the MT-IRAP in Experiment 1 (e.g., "Remember that self-reliance is highly valued"). The statements for the D and F phases were neutral, for example, "Remember that paying attention is highly valued." All statements used are shown in Table 4. In the CDCD sequence, the motivational statement was intended to increase individual responding despite a profit-share contingency (i.e., equal compensation for individual or cooperative responding) and in the EFEF sequence, the statement was intended to increase cooperative responding despite no compensation (i.e., piece rate for individual responding only).

Table 4.

Motivational and Neutral Statements Presented During Data Entry Task

Individual statements	Cooperative statements	Neutral statements
Remember that self-reliance is highly valued. (C)	Remember that a cohesive effort is highly valued. (E)	Remember that paying attention is highly valued. (D) & (F)
Remember that being independent is highly valued. (C)	Remember that being in a partnership is highly valued. (E)	Remember that staying on task is highly valued. (D) & (F)

Note. The experimental phases in which statements were presented are listed in parentheses following each statement.

Post questionnaire. Upon completion of the work task, participants were paid the money they had earned and provided with a post questionnaire to assess their perception of the experimental phases. The questionnaire asked participants how the monetary contingencies and experimental messages affected their behavior. In addition, it evaluated their reaction to the changing background color, if they thought the partner was real or simulated, and if they perceived a difference in response effort between working individually and cooperatively. The final two questions asked participants if they had spoken to anyone about the study (e.g., previous participants) or if anything happened in the week prior that may have influenced their tendency to cooperate or not.

Results

IRAP. Raw latency data were converted into D-IRAP scores using the algorithm described by Barnes-Holmes et al. (2010). D-IRAP scores were categorized into neutral, small, medium, and large effects as described previously. D-IRAP scores were calculated such that positive values indicated a pro-cooperative implicit relational response and negative scores indicated a pro-individual implicit relational response. D-IRAP scores for each participant are presented in Figure 2.

IRAP effects, as indicated by the D-IRAP scores, were calculated separately for each list of individual or cooperative stimuli, for each participant. This allowed for assessment of implicit relational responding with respect to individual and cooperative stimuli in isolation, in order to provide a more comprehensive picture of participants' preexisting implicit social biases for the

purpose of experimental sequence assignment. Unlike the MT-IRAP, because the standard IRAP is a forced choice procedure, scores that are positive indicate correspondence with the programmed hypotheses (cooperative words as similar to good, individual words as similar to bad) and negative scores as the opposite (cooperative words as similar to bad, individual words as similar to good). In particular, participants were categorized as "cooperative" if both of their D-IRAP scores for individual and cooperative stimuli were >.5 (participants 1, 8, 11, 13, and 20). Participants were categorized as "weakly cooperative" if the cooperative score was from .2 to .49 and the individual score was between -.2 and .49 (participants 4, 6, 7, 15, and 17). Participants were considered "neutral" if their two D-IRAP scores were between -.2 and .2 (participants 5, 9, and 14) or if their results were considered inconclusive due to conflicting responding (both pro-cooperative and pro-individual) or inconsistent effect sizes (participants 3, 10, 12, 18, and 19). Lastly, two participants were categorized as "individual," based on exhibiting at least one D-IRAP score of <-.2 (pro-individual) and the second D-IRAP score being at least neutral if not also pro-individual (participants 2 and 16).

Based on the above categorical analyses, participants from each category were divided between the two experimental sequences for the data entry task, in order to control for preexisting implicit biases toward behaving individually or cooperatively. In Figure 2, participants 1–10 are those who were assigned to the first experimental sequence (ABABCDCD); participants 11–20 were assigned to the second sequence (BABAEFEF).

[Figure 2 about here]

Data entry task. ***Effect of financial contingencies on responding.*** The effect of the financial contingencies on cooperative versus individual responding was primarily determined through visual inspection of session-by-session data for each participant. For the participants in

the ABABCDCD sequence, the average percentage of responses allocated to individual responding is shown in Figure 3. Individual responding is highlighted because the goal of this reversal sequence was to increase individual responding in the motivational (C) phases. For the participants in the BABAEFEF sequence, the average percentage of responses allocated to cooperative responding is shown in Figure 4, because the goal of the BABAEFEF sequence was to increase cooperation in the motivational (E) phases. Only the initial four phases in each sequence were evaluated for control by the financial contingency, because the latter four had the addition of the motivational and neutral statements.

[Figures 3 & 4 here]

Visual inspection of the data indicated that during the first four phases (A and B phases only), the majority of participants behaved individually during the piece-rate phases and cooperated during the profit-share phases, regardless of experimental sequence. A slight majority (11 out of 20) of participants (2, 5, 6, 8, 9, 10, 15, 16, 17, 19, and 20) behaved almost exclusively individually during piece-rate phases and cooperatively during profit-share phases. An additional four participants (1, 7, 11, and 14) worked primarily individually during piece rate, and then increased their cooperative responding from the first to second profit-share phase. Of the remaining five participants, three participants (3, 12 and 18) had somewhat higher percentages of cooperative responding during the profit-share phase relative to the piece-rate phase. Participant 4, however, worked almost exclusively individually regardless of phase and Participant 13 allocated responding equally between cooperative and individual options, regardless of phase.

A post-hoc paired-samples *t*-test was conducted to verify conclusions drawn from visual analysis. The results indicated that participants cooperated significantly more during the profit-

share phases (M = .77, SD = .31) than during the piece-rate phases (M = .05, SD = .11), $t(19)$ = -9.14, $p < .001$, d = -2.04.

Effect of motivational statements on responding. Figures 3 and 4 reflect overall response allocation per phase for each participant in the ABABCDCD and BABAEFEF sequences, respectively. Individual session-by-session graphs are presented for select participants to highlight representative response patterns to the different motivational statements (see Figures 5–8).

For the ABABCDCD sequence, a motivational statement was introduced at the beginning of the C phase to increase individual responding under a financially neutral contingency (profit share). Visual inspection of the session-by-session graphs indicated that the majority of participants increased their individual responding following the presentation of the motivational statement. More specifically, 8 out of the 10 participants (1, 3, 5, 6, 7, 8, 9, and 10) exhibited an increase in individual responding to the first motivational statement. Of those eight participants, five (3, 5, 7, 8, and 10) also demonstrated an increase in individual responding as a result of the second motivational statement (for example participant, see Figure 5). However, the effects were generally not as pronounced and were more variable than individual responding to the first statement (for example participant, see Figure 6). All eight participants that exhibited increases in individual responding related to the first motivational statement also decreased individual responding (reversal) following the introduction of the first neutral statement (Phase D). Four of those participants (3, 5, 7, and 10) replicated this result, though to a more variable degree, in the second motivational and neutral statement phases. Participant 4, who worked exclusively individually in prior phases, actually increased cooperative responding instead, and then went

back to exclusively working individually (see Figure 3). This is noteworthy because it directly contradicts the content of the motivational statement.

[Figures 5 & 6 here]

In the BABAEFEF sequence, a motivational statement was introduced at the beginning of the E phase to increase cooperative responding under a financial-cost contingency (piece rate). Although some of the participants in the BABAEFEF sequence responded to the motivational statements, it was to a much smaller degree than in the ABABCDCD sequence. Five participants (12, 14, 15, 17, and 18) exhibited an increase in cooperative responding related to either the first or second motivational statement. Participant 12 was the only participant to exhibit an increase in cooperative responding to both motivational stimuli; however, the response to the second stimulus was small (see Figure 7). In addition, the increase in cooperative responding by participants 17 and 18 was also small and variable (for example participant, see Figure 8), and for Participant 15 was negligible. Participants 11, 16, 19 and 20 exhibited no change in cooperative responding to either the motivational or neutral stimuli. Participant 13, who evenly allocated responding between cooperative and individual work during all prior phases, actually decreased their cooperative responding in response to the initial motivational statement. Following removal of the motivational stimulus, this participant again allocated their responses evenly between individual and cooperative work (see Figure 4). Similar to Participant 4 in the ABABCDCD sequence, this pattern of responding is interesting because it contradicts the content of the statements.

[Figures 7 & 8 here]

A series of post-hoc paired-samples *t*-tests were conducted to verify conclusions drawn from visual analysis. In the ABABCDCD sequence, participants' individual responding was

significantly higher following the introduction of the first motivational statement (M = .53, SD = .31) than in the previous profit-share phase (M = .83, SD = .32), $t(9) = 3.68$, $p < .01$, $d = 1.16$. In the BABAEFEF sequence, however, participants' cooperation levels were not significantly higher in the initial motivational statement phase (M = .04, SD = .06) than the prior piece-rate phase (M = .06, SD = .15), $t(9) = .60$, $p > .05$, $d = .19$. The reversal of the effects of the motivational statement in the ABABCDCD sequence were substantiated, because participants behaved individually significantly more during the motivational phases (M = .57, SD = .33) than the neutral phases (M = .73, SD = .34), $t(9) = -3.30$, $p < .01$, $d = -1.04$. In the BABAEFEF sequence, however, cooperative levels of responding did not change significantly from the motivational phases (M = .06, SD = .10) to the neutral phases (M = .07, SD = .14), $t(9) = -.54$, $p > .05$, $d = -.17$.

Post questionnaire results. For the questionnaire, the questions and answers that are most relevant to the outcomes of the study are highlighted below.

Question 1. During the task, did you primarily work alone or fix your partner's errors? Why? Most participants correctly identified their response allocation. It is interesting that one participant (Participant 13) stated that they were concerned about accuracy and tried to do both (i.e., work alone and fix partner's errors). Indeed, they evenly allocated their effort between behaving individually and cooperating for the majority of the experiment.

Question 2. Did you think that your partner was a real person—yes or no? The majority of participants, regardless of experimental sequence, did not believe the partner was real. Only four participants (4, 5, 8, 13) thought they were working with an actual person. It is interesting that two of those participants (4 and 13) were also the participants that were insensitive to the financial contingency and either worked almost exclusively alone (Participant 4) or allocated

responding equally (Participant 13) regardless of phase. Of those participants who did not believe the partner was real, one stated that they did not really think about the partner (Participant 3) and another thought the partner was not real, but still felt the need to help (Participant 7).

Question 3. Did you think that one of the two tasks, working alone or fixing errors was more difficult—yes or no? If yes, which one was more difficult? Most participants across both sequences (15 out of 20) indicated that working alone was more difficult and/or took longer to complete a response, which accurately reflects the slight difference in duration between the two response options.

Questions 8, 9, and 10. Did you notice the written messages and did it change your cooperative behavior? All participants said that they had noticed the message; however, many of the participants were unable to identify exactly how the message affected their responding. For example, some participants stated that it increased their cooperation when it actually decreased it (primarily in the ABABCDCD sequence). Many participants (3, 4, 5, 6, 8, 9, 10, 14, 15, 16, 18) stated that they initially increased/decreased cooperation because they thought something had changed. When they realized the contingencies were the same, they stated that they went back to previous levels of cooperative responding.

Questions 11 and 13. Did something occur between the first and second experiment to affect your cooperation and had you heard anything about the study ahead of time? Participants 13 and 20 were the only participants that answered yes to either question. Participant 13 had an experience that potentially increased their probability of cooperating and Participant 20 had an experience that likely decreased their probability of cooperating. It is interesting that Participant

13 cooperated regardless of the financial contingency and Participant 20 did not respond to the pro-cooperative statement.

Discussion

As previously noted, researchers have only a limited understanding of how statements issued as memos or speeches operate in the work environment, despite literature indicating the key role that rules play in organizations (e.g., Houmanfar, Rodrigues, & Smith, 2009; Malott, 1992). Indeed, because so many organizations utilize these forms of communication, it is important to understand how the content of such messages operates on behavior. This is particularly critical when the message or speech is intended to motivate a particular response. These messages do not operate in isolation, however, and their relative impact on behavior in conjunction with pay systems and one's social history must also be considered.

The current study was an attempt to further isolate the differential effects of not only financial consequences, but also motivational statements and preexisting implicit relational responding on cooperative behavior. Consistent with previous research, the current study found that financial contingencies played a primary role in motivating cooperative and individual responding (e.g., Maglieri, 2007). Indeed, participants primarily worked individually during piece-rate phases and either cooperated or allocated their responding fairly evenly between the individual and cooperative options during profit-share phases. Implications for the business community then are to ensure that whatever payment systems are in place, employees and supervisors do not allocate responding to one behavior at the expense of another. Similar to the Wells Fargo example given earlier, if a rule is given that money is contingent on a particular response, individuals may follow that rule to the detriment of the customers, other coworkers,

and the company. As such, it is recommended that financial compensation systems be designed so that they are balanced across key behaviors for the organization (Abernathy, 1996).

In addition to changes in responding to the financial contingencies, the introduction of the motivational statements also affected responding. This was most clearly illustrated in the ABABCDCD experimental sequence, where 8 out of 10 participants increased individual responding during the financially neutral contingency (i.e., profit share). This shift in responding tended to be more temporary and variable when compared to either financial phase alone, suggesting that motivational statements may not exert as strong an effect on behavior as the financial contingencies. This is an important finding, however, given that so many of the participants' measures of implicit relational responding indicated a pro-cooperative bias. During prior financially neutral conditions they were more likely to cooperate (sometimes exclusively), so the increase in individual responding further supports the strength of the effect of the motivational statements.

During the financial contingency in which helping their partner resulted in a financial loss, individuals tended to be less responsive to the motivational statement. In the BABAEFEF sequence, participants only slightly increased their cooperative responding when doing so resulted in a lost opportunity to earn money; in fact, most participants did not alter their responding at all under these conditions. Taken together, these results suggest that motivational statements are more likely to influence behavior under financially neutral conditions. These findings, combined with those from the financial contingencies alone, suggests that management can utilize both when attempting to motivate responding, cooperative or otherwise. In particular, financial contingencies could be established that support (or at minimum do not discourage) other forms of behavior. One example of this is seen in the safety community, where incentives

for performance will commonly lead workers to take shortcuts and jeopardize their safety (see discussion by Wilder & Sigurdsson, 2015). An organization that has a neutral compensation system would be more likely to increase safe behavior when rules such as "Safety is our Goal" or "Safety is our #1 Priority" are given. So although some may argue for the importance of motivating employees through management communication, others recommend caution given their limited effectiveness (Roos, 2013; Daniels & Bailey, 2014). The current study seems to indicate that some of that limited effectiveness may not be the messages themselves, but rather the lack of alignment with financial contingencies of the organization.

The alignment of these motivational statements with organizational financial contingencies may also be critical when considering the mechanism by which these statements may have influenced responding. Although the current study was not designed to answer this question explicitly, some of the participants' response patterns may indicate the function of these statements. For example, the statements utilized in the current study resulted in temporary and variable changes in behavior. This is consistent with response patterns one would predict if the statements functioned as motivative augmentals (Hayes et al., 2001; Jackson et al., 2016). The temporary increase in individual or cooperative responding when the motivational statements were introduced may have been due to this change in the reinforcing value of engaging in those responses. This is in contrast to a higher, consistent response pattern one would expect to see if the statements had discriminative properties, similar to those seen with the changing background color for the financial contingencies. Jackson et al. also considered the possibility of discriminative effects of the statements utilized in that study, as opposed to motivational effects, and although they could not say with certainty, the data suggested the observed effects were

produced via motivational influences on behavior, rather than by way of discriminative influences.

It is also possible that the statements (rules) functioned as plys or tracks. Because changes in responding were mostly temporary and/or variable, it is more likely that the statements functioned as motivative augmentals than plys. If participants had responded exclusively in correspondence with the motivational statements, particularly if they were losing money, one would assume that some other factors were maintaining that responding, such as rule following due to potential undesirable consequences delivered by the rule giver for not following the rule (i.e., pliance). The majority of participants did not exhibit this pattern of responding.

On the other hand, the statements may have functioned as inaccurate tracks. Tracks can be delivered by others or be self-generated, and they are not necessarily accurate or explicit with regard to the contingent relationship (between behavior and the naturally occurring consequence) they describe. Previous research has demonstrated that inaccurate rules (i.e., the behavior and/or consequences stated in the rule are not what are actually experienced) and rules that are not explicit in fully describing the behavioral contingency (i.e., implicit rules) can have variable and detrimental effects on responding (Johnson, Houmanfar, & Smith, 2006; Smith, Houmanfar, & Denny, 2009). In the present case, it may be that responding briefly came under control of the motivational rule statement, but participants quickly learned that any implied consequences (e.g., financial gains) were not being realized (indicating an inaccurate rule), at which time responding came back under the control of the financial contingencies and associated discriminative stimuli (background color). Although this conclusion is speculative, this is at least plausible in the BABAEFEF sequence, in which only individual responding was reinforced in the presence of motivational statements that promoted cooperative responding. Questionnaire results (i.e.,

responses to questions 8, 9, and 10) provide further support as several participants reported changing responding because the statement seemed to indicate a shift in the financial contingency, but when they realized that payment had not changed, they returned to prior levels of responding.

Understanding that memos and other messages may only have a temporary effect on responding may have important implications for industry. If the motivational statements function as motivative augmentals, it may be necessary for individuals to come into contact with additional reinforcement in order to maintain responding. However, for some participants, the statements utilized in the current study may have functioned as inaccurate tracks, in which case, organizations would want to ensure that statements accurately reflect organizational or financial compensation changes. As previously mentioned, if organizations repeatedly issue statements that are inconsistent with these contingencies, it may have detrimental effects, such as employees not trusting what management says, decreased performance, or even countercontrol responses.

The specific content of the statements may also influence the degree to which responding is affected. The current study utilized a relatively new IRAP procedure for identifying stimuli for the motivational statements. Whether or not the MT-IRAP is preferable to other methods of stimulus identification is not clear. However, the MT-IRAP was relatively efficient (e.g., 20 minutes) at identifying stimuli that functioned as institutional stimuli (Kantor, 1982) and corresponded to a shared response from the group. As mentioned previously, organizations are unlikely to spend the resources necessary to personalize messages for each employee. This technology could be utilized by organizations to identify stimuli that could be used with a large number of people, rather than assessing and intervening on one employee at a time.

Social influences on cooperative and individual responding require further research as well. The traditional IRAP was utilized to assess implicit responding with respect to cooperation prior to the start of Experiment 2. Due to space limitations, the results of the correspondence between these implicit relational responses and actual cooperation levels were not reported, but in essence they were not found to be related. This finding does not definitively demonstrate that implicit relational responding pertaining to cooperating and overt cooperation are not related, but due to the small sample size, particularly with having only two participants who were pro-individual, more research is needed. In addition, there may have been other social influences not captured by the current study (e.g., real partner and work history), which may have affected the extent to which implicit responding and overt behavior corresponded. Future research should evaluate the differential effect some of these other social factors may have on cooperative responding.

Finally, the current study had a number of limitations that are important to highlight. First, this was an analogue study with a limited time frame and utilized college students as participants. As such, future research should investigate whether the same effects would be observed in actual organizational settings. In addition, because the pay systems were approximations (particularly the profit share), these results should be replicated and extended with different variations of these pay systems as they are more commonly found in business settings. Lastly, there were several procedural limitations that may have influenced the results, including the length of phases, differences in task duration between cooperative and individual responding, and the simulated partner. Future research might look at breaking up the task or providing breaks to address fatigue. With regard to the difference in task duration, each cooperative response, on average, took approximately 6.4 seconds to complete, whereas each

individual response took approximately 7.2 seconds. As a result, phases in which participants exhibited a higher proportion of individual responses, or more frequently switched between the tasks, showed a decrease in productivity (total responding per 12-min phase minus incorrect responses). To control for this effect, future studies should attempt to equate the response duration of the tasks. Finally, in order to provide a free operant response so that there was no ceiling constraint on participants' cooperative responding, the current study sacrificed the believability of the simulated partner. That is, participants did not believe that a real partner would have made so many mistakes for the participants to correct. This issue may have increased the likelihood that individuals would respond to the motivational statement encouraging them to work individually. Because there was no actual partner, the social consequences associated with no longer helping them may not have been present. Although cooperation can be defined a number of different ways, cooperation as a behavior typically includes some level of interaction between two or more individuals (e.g., Rosenberg, 1960), which was missing from this study. Toward this end, developing a task in which unlimited errors would naturally be available and that includes some interaction with a partner (such as a confederate) is recommended. If similar increases in individual responding are found despite a more believable partner, it would further support the effectiveness of the motivational statements.

In conclusion, results of the current study indicate that statements containing content identified from the IRAP were successful in changing behavior, similar to the findings by Jackson et al. (2016). Also similar to Jackson et al., results indicated that these messages had only a temporary effect, which may indicate that they functioned as motivative augmentals. Unfortunately, the exploration of verbal behavior in organizational settings remains limited (see discussion by Hayes, 2005), especially regarding research on motivative augmentals (see review

by Kissi et al., 2017). Although more research is needed, it may be helpful for organizational leaders to add social and tangible consequences to their messages for a more sustained effect on responding. At the very least, management should be cautious of financial contingencies that are not aligned with or contradict their motivational messages, because results of the current study seemed to indicate that statements that contradict financial contingencies may have little or no effect on responding. Given the important role that leaders, and their communication, play in organizational settings (Houmanfar, Alavosius, Morford, Herbst, & Reimer, 2015), financial consequences should support organizational messages, or at least remain neutral, in order to increase their effectiveness on not only performance, but also cooperation and other pro-social behaviors.

Compliance with Ethical Standards

Conflict of Interest: Sharlet Rafacz declares that she has no conflict of interest, Ramona Houmanfar declares that she has no conflict of interest, Greg Smith declares that he has no conflict of interest, and Mike Levin declares that he has no conflict of interest.

Ethical approval: All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed consent was obtained from all individual participants included in the study.

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Figure Captions

Figure 1 Flowchart indicating procedures for Experiment 2. Participants completed the IRAP and were then assigned to one of two experimental sequences for completing the data entry task, which included practice trials, test trials, and a post questionnaire

Figure 2 D-IRAP scores for lists of individual and cooperative stimuli by participant. Positive scores indicate a pro-cooperative implicit bias, negative scores indicate a pro-individual implicit bias. Participants 1-10 were assigned to sequence ABABCDCD, 11-20 were assigned to BABAEFEF

Figure 3 Participants 1-10: each participant's average percentage of responses allocated to individual responding per phase in the ABABCDCD experimental sequence

Figure 4 Participants 11-20: each participant's average percentage of responses allocated to cooperative responding per phase in the BABAEFEF experimental sequence

Figure 5 Session-by-session individual and cooperative responding for Participant 5

Figure 6 Session-by-session individual and cooperative responding for Participant 10

Figure 7 Session-by-session individual and cooperative responding for Participant 12

Figure 8 Session-by-session individual and cooperative responding for Participant 17

Figure 1

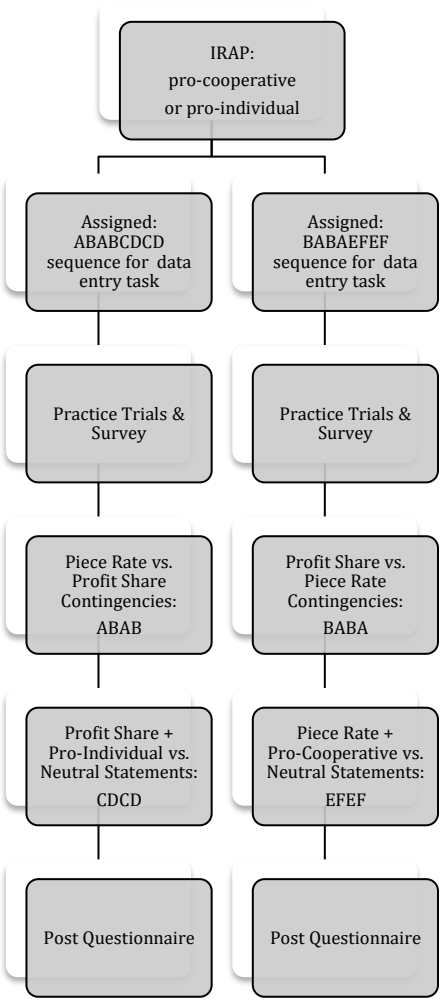

IRAP:
pro-cooperative
or pro-individual
Assigned:
ABABCDCD
sequence for data
entry task
Assigned:
BABAEFEF
sequence for data
entry task
Practice Trials &
Survey
Practice Trials &
Survey
Piece Rate vs.
Profit Share
Contingencies:
ABAB
Profit Share vs.
Piece Rate
Contingencies:
BABA
Profit Share +
Pro-Individual vs.
Neutral Statements:
CDCD
Piece Rate +
Pro-Cooperative vs.
Neutral Statements:
EFEF
Post Questionnaire
Post Questionnaire

Figure 2

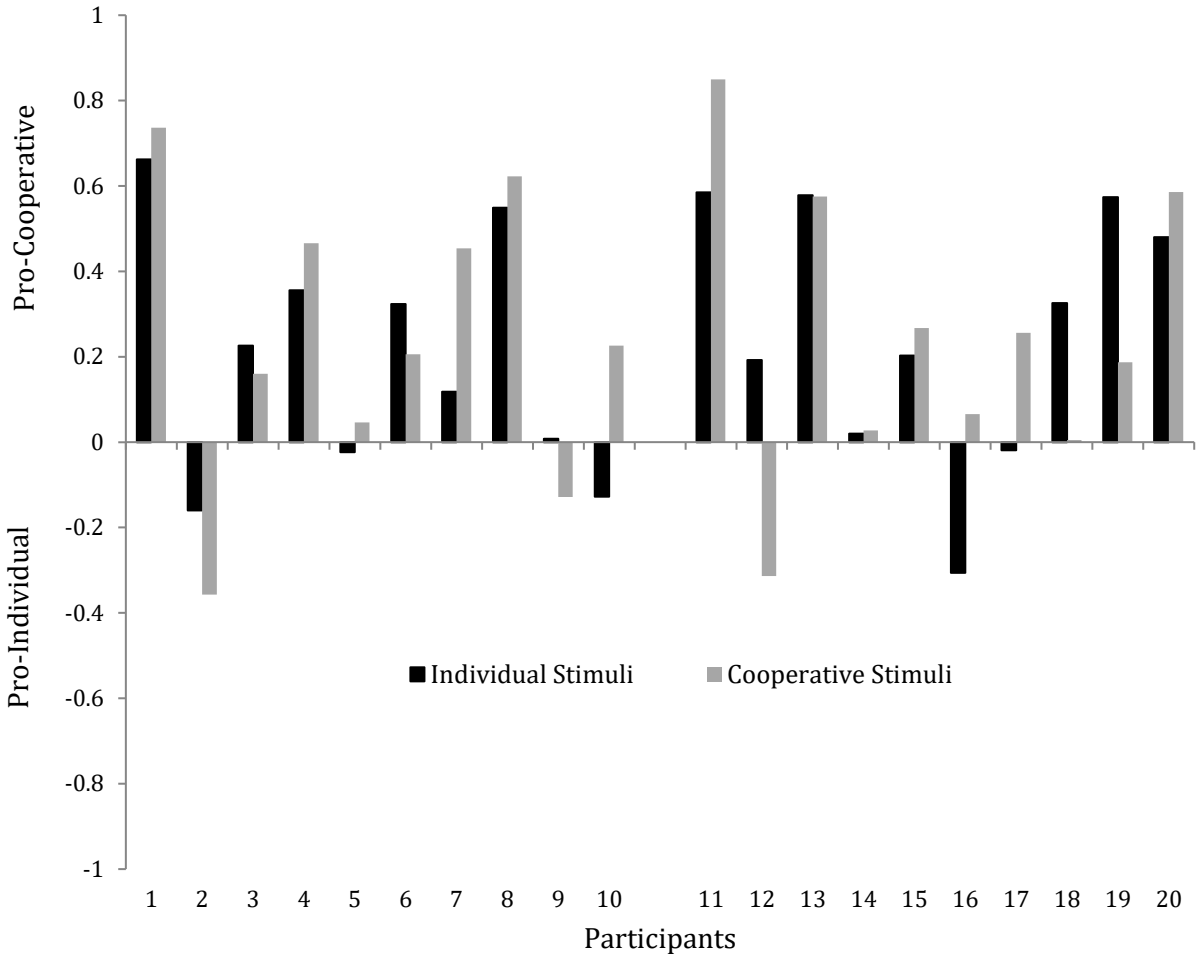

1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Pro-Cooperative
Pro-Individual
Individual Stimuli
Cooperative Stimuli
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Participants

Figure 3

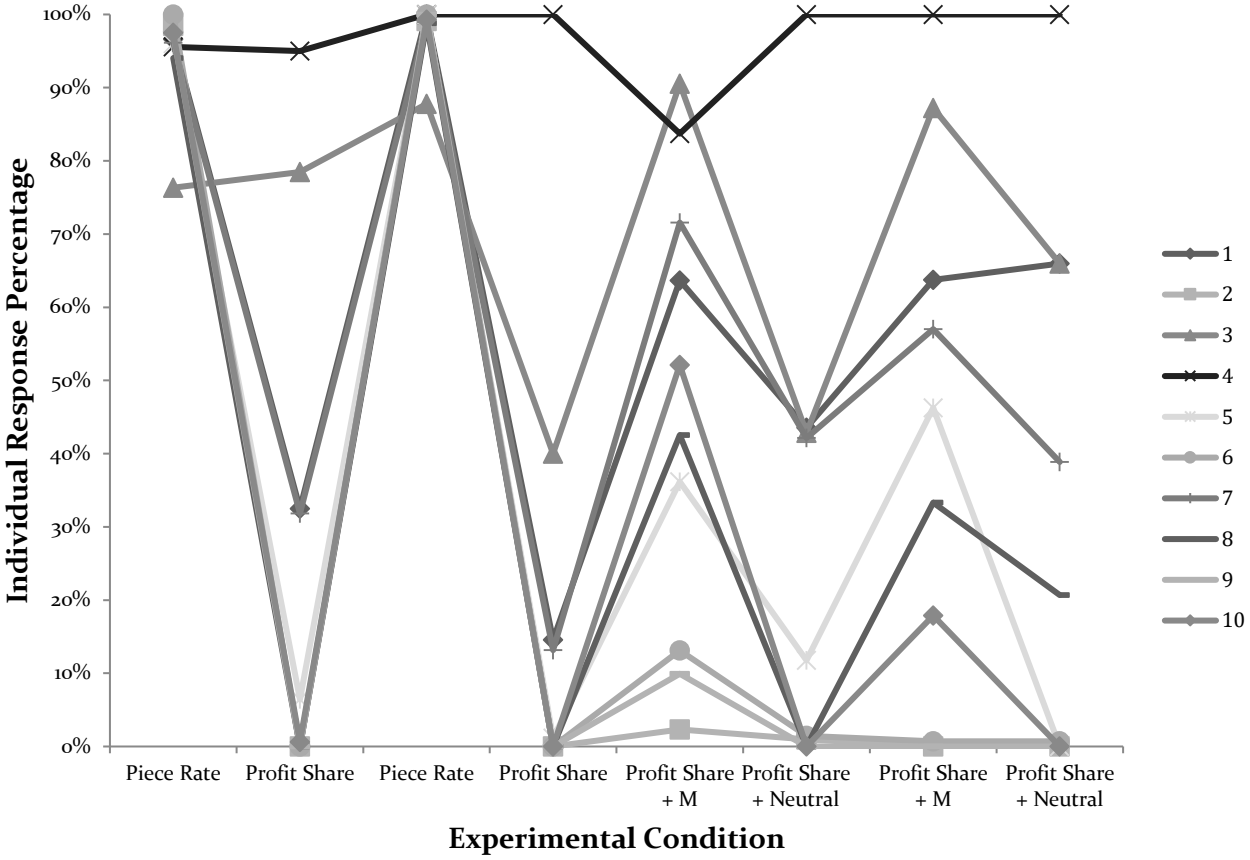

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Individual Response Percentage
Piece Rate
Profit Share
Piece Rate
Profit Share
Profit Share + M
Profit Share + Neutral
Profit Share + M
Profit Share + Neutral
Experimental Condition
1
2
3
4
5
6
7
8
9
10

Figure 4

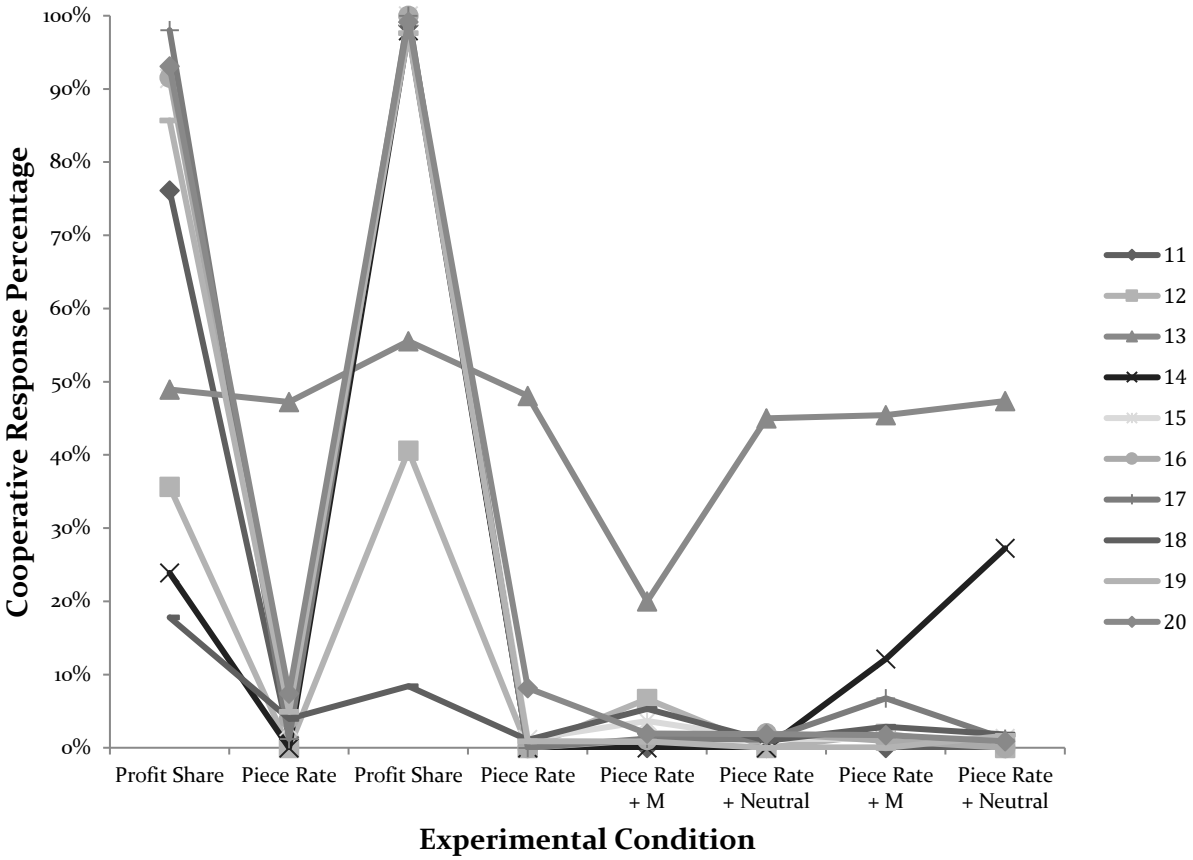

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cooperative Response Percentage
Profit Share
Piece Rate
Profit Share
Piece Rate
Piece Rate + M
Piece Rate + Neutral
Piece Rate + M
Piece Rate + Neutral
Experimental Condition
11
12
13
14
15
16
17
18
19
20

Figure 5

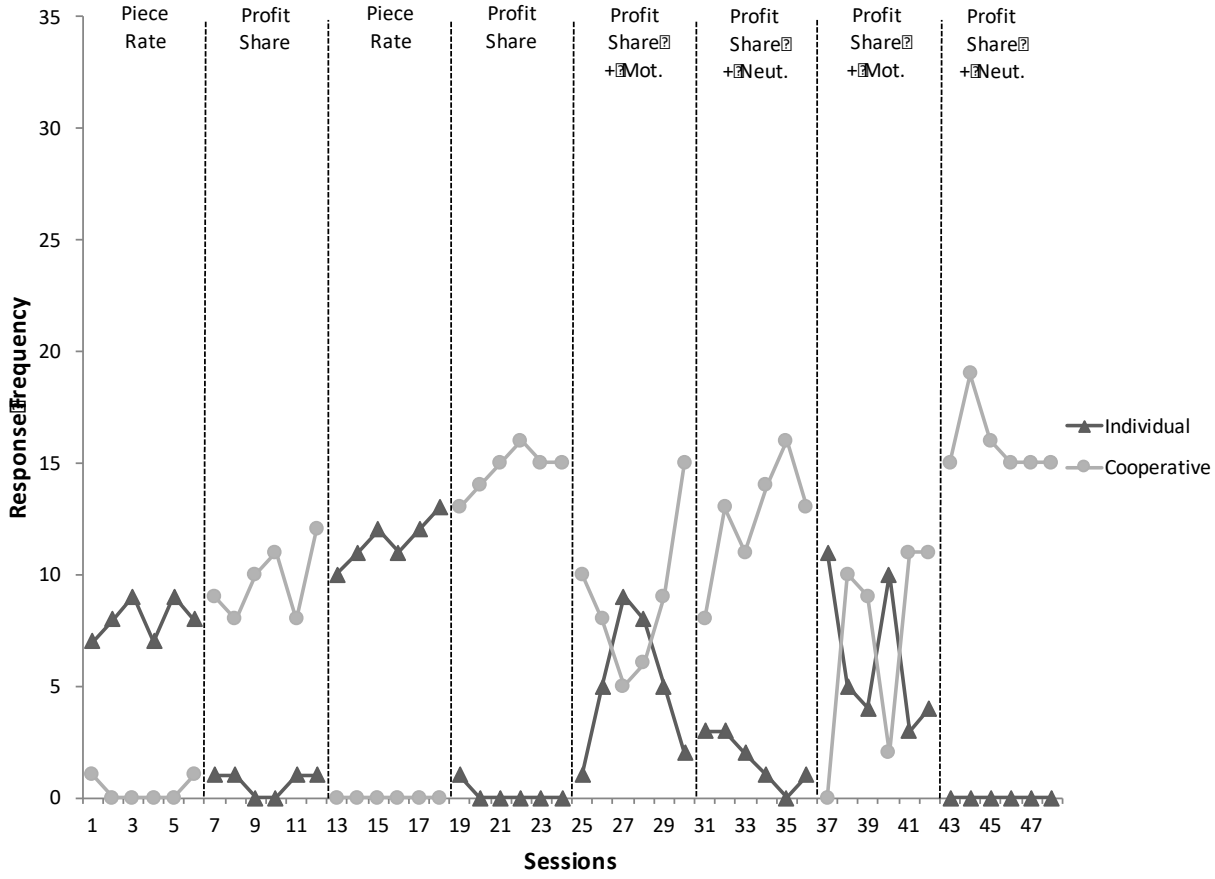

Piece Rate
Profit Share
Piece Rate
Profit Share
Profit Share + Mot.
Profit Share + Neut.
Profit Share + Mot.
Profit Share + Neut.
Response Frequency
Sessions
Individual
Cooperative
0
5
10
15
20
25
30
35
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47

Figure 6

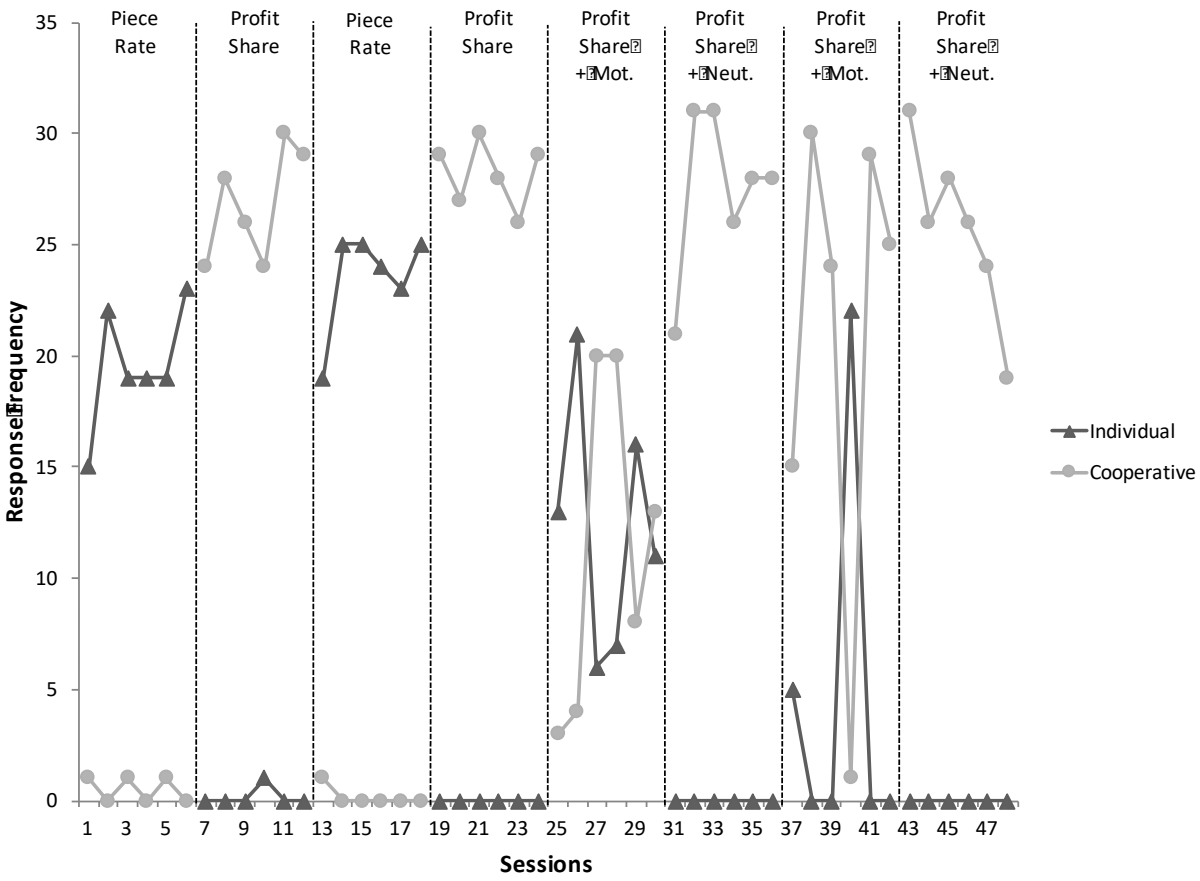

Piece Rate
Profit Share
Piece Rate
Profit Share
Profit Share + Mot.
Profit Share + Neut.
Profit Share + Mot.
Profit Share + Neut.
Response Frequency
Sessions
Individual
Cooperative
0
5
10
15
20
25
30
35
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47

Figure 7

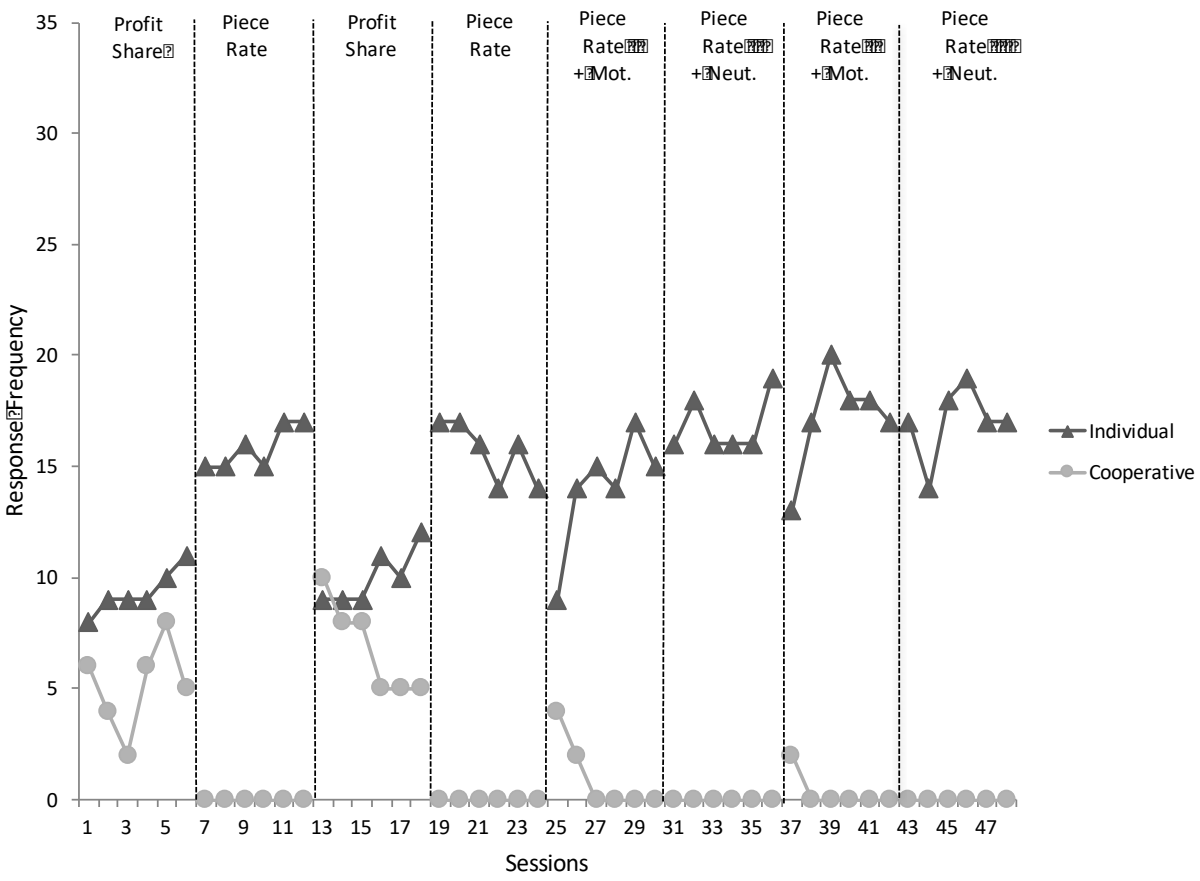
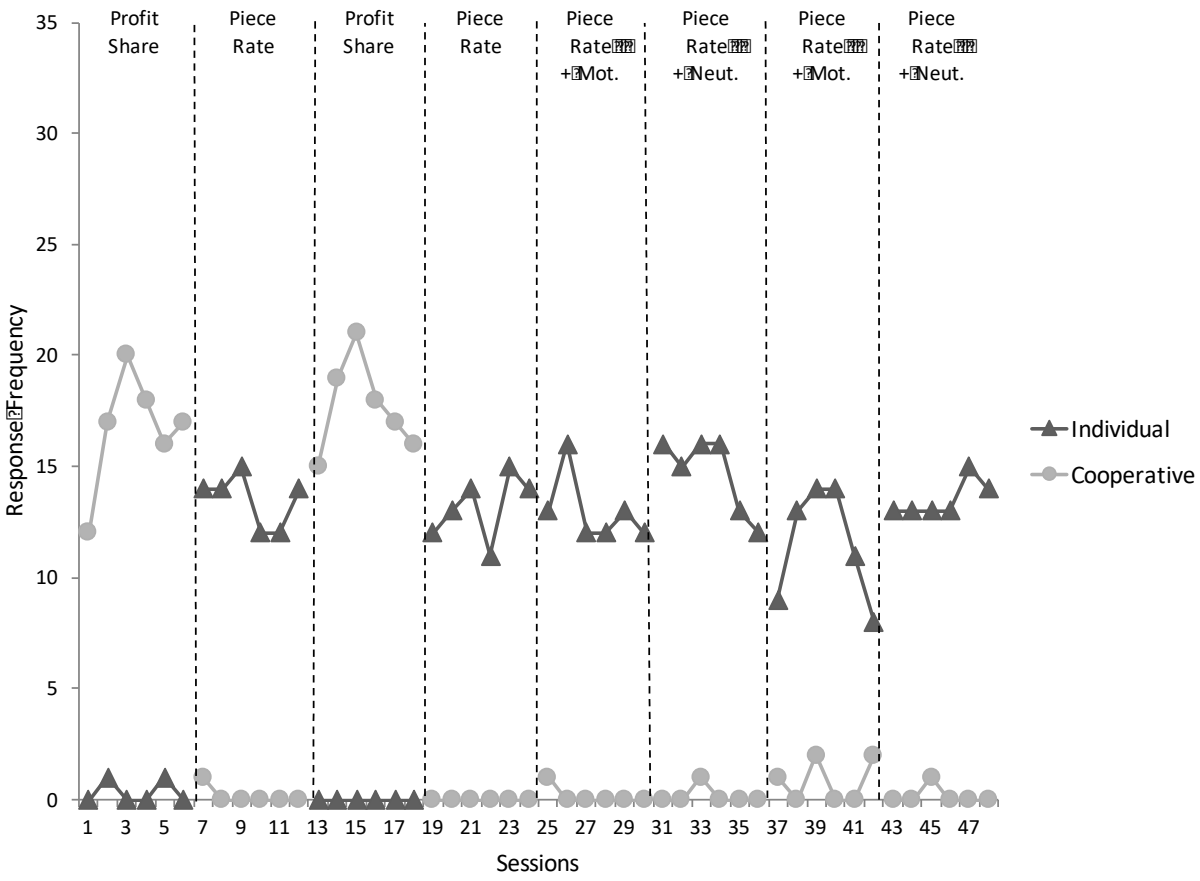
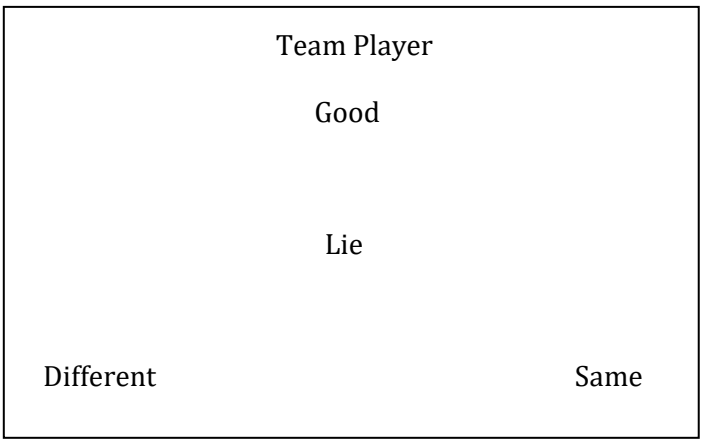

Profit Share
Piece Rate
Profit Share
Piece Rate
Piece Rate + Mot.
Piece Rate + Neut.
Piece Rate + Mot.
Piece Rate + Neut.
Response Frequency
Sessions
Individual
Cooperative
0
5
10
15
20
25
30
35
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47

Figure 8


Profit Share
Piece Rate
Profit Share
Piece Rate
Piece Rate +Mot.
Piece Rate +Neut.
Piece Rate +Mot.
Piece Rate +Neut.
Response Frequency
Sessions
Individual
Cooperative
0
5
10
15
20
25
30
35
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47

Appendix

Example of Mixed-Trial Implicit Relational Assessment Procedure Screen



Screen Shot of Data Entry Task