The Effects of Multi-Level Group Identification on Intergroup Cooperation and Performance

Jason L. Brown
Geoffrey B. Sprinkle*
Dan Way

Kelley School of Business
Indiana University
1309 E. Tenth Street
Bloomington, IN 47405
United States

*Corresponding author
Email addresses:
browjaso@indiana.edu (J. L. Brown),
sprinkle@indiana.edu (G. B. Sprinkle),
danway@indiana.edu (D. Way)

We thank Lori Shefchik Bhaskar, Andrea Drake, Cassandra Estep, Joe Fisher, Pat Hopkins, Lee Kersting, Michael Majerczyk, Patrick Martin, Joe Pacelli, Heather Pesch, Barrett Wheeler, participants at the 2017 AAA Ohio Region Meeting, participants at the 2017 AAA Annual Meeting, participants at the 2018 AAA MAS Midyear Meeting, and participants at the Ball State University, Emory University, Erasmus University-Rotterdam School of Management, and Indiana University research workshops for their very helpful comments and suggestions. We also thank the Kelley School of Business at Indiana University for the generous financial support. A previous version of this manuscript was awarded Andrews Best Paper at the 2017 AAA Ohio Region Meeting.

The Effects of Multi-Level Group Identification on Intergroup Cooperation and Performance

ABSTRACT: We conduct an experiment to examine the effects of multi-level group identification on intergroup cooperation and performance. We predict and find that stronger identification with a sub-group (one's immediate work-group) and a superordinate group (the organization in which that group is nested) – separately and interactively – increase cooperation. We also find that, consistent with expectations, these effects are mediated by individuals' perceptions of intergroup competition and a greater concern for the larger collective. Moreover, we find that performance is actually lower when individuals choose to cooperate and provide evidence that this effect stems from the decision to cooperate itself rather than from group identification or other factors. Collectively, our findings illustrate the importance of understanding how individuals perceive and identify with the different groups naturally present in multi-level organizations, as well as how accounting information and controls can affect, and be affected by, identification processes. Such an understanding can help firms determine the best organizational hierarchy, develop communication and control strategies to build identification at appropriate levels, and establish evaluation and compensation systems that measure and reward outcomes in a manner that accounts for these group effects.

Keywords: Groups; incentives; group identification; cooperation; performance

1. Introduction

Much accounting research examines the relationship between formal and informal controls, often documenting that informal controls reduce or supplant the need to develop and use costly accounting-based performance measures that impose risk on employees. For example, the rich and extensive literature examining the truthful revelation of private information consistently documents that individuals are more honest than agency models posit (Evans, Hannan, Krishnan, & Moser, 2001) and, as such, firms can rely on trust-based contracts rather than hurdle-based contracts (Antle & Eppen, 1985). Analogously, we do not observe as much free-riding in group settings as economic models predict, mitigating the need for performance and reward measures that isolate individual contributions from team contributions (see Chaudhuri (2011) for a review).

At a broad level, individuals engage in these other-regarding behaviors because they identify with the needs and wants of others. Such identification takes two general forms – in principal/agent settings, it is identification with the firm/organization (superordinate group). In team settings, it is identification with one's immediate work group (sub-group). As team production is the key reason firms exist (Zimmerman, 2017), both types of identification naturally co-exist in organizations.

In this paper, we use a controlled laboratory experiment to examine the effects of multi-level group identification on intergroup cooperation and performance.[1] In our experiment, we manipulate between-participants both sub-group (team) identification and superordinate group (firm) identification as either stronger or weaker. During the experiment, participants assume the role of workers completing a task as part of a three-person group (the sub-group manipulation)

[1] We define intergroup cooperation as an individual's choice to expend effort at a personal cost to benefit members of another sub-group within the organization. Our operationalization of cooperation is similar in spirit to the cooperation studied in public goods settings (Derlega & Grzelak, 2013), where individuals have the opportunity to engage in positive pro-social (helping) behaviors that increase or improve the outcomes of others.

nested within a company (the superordinate group manipulation) comprised of three groups.

In each of four, four-minute periods, participants first work on a task to benefit themselves and their group. This task, on average, takes participants 1.5 minutes to complete. Participants then face a social dilemma: Participants choose whether to have the work they complete in the time remaining in the period either benefit themselves alone or benefit themselves and a *different* group within their company. Under the second option, piece-rate compensation to the participant is half as much as it is under the first option, but the three members of the other group chosen by the participant to benefit from the additional work also receive compensation, leading to higher collective welfare. We measure cooperation as the choice to work for the benefit of one's self and a different group within the company.

Consistent with our predictions, we find that stronger sub-group identification leads to more frequent intergroup cooperation and that stronger superordinate group identification leads to more frequent intergroup cooperation. Additionally, we find that the effect of sub-group identification on cooperation is more than four times that of superordinate group identification. Consistent with our predictions, we also find an ordinal interaction between sub-group identification and superordinate group identification – stronger sub-group identification coupled with stronger superordinate group identification leads to an increase in cooperation beyond the combined main effects. Thus, we find that the positive effects of stronger sub-group identification and stronger superordinate group identification are neither substitutes nor are they simply additive.

These findings suggest that firms may benefit from organizational structures, activities, and communication and reporting strategies that foster identification at different levels of the organization. For example, managerial accounting textbooks discuss the benefits and costs of decentralization (Horngren, Datar, & Rajan, 2014). As increased decentralization has been shown

to lead to higher levels of sub-group identification (Ashforth, Harrison, & Corley, 2008), our finding that sub-group identification is a significant predictor of intergroup cooperation suggests another potential benefit to decentralization beyond those identified in prior research (e.g., Indjejikian & Matějka, 2012). Moreover, engaging in corporate social responsibility activities and reporting may increase identification with the firm (Glavas & Kelley, 2014) which, in turn, could reduce the reliance on formal accounting controls to achieve desired intergroup cooperation.

We also model and test the process through which group identification affects intergroup cooperation. Results indicate that higher levels of perceived intergroup competition lead to less intergroup cooperation, while higher levels of concern for the larger collective lead to more intergroup cooperation. This highlights the importance of considering how various controls and accounting information affect individuals' perceptions of these factors in work settings. For example, relative performance information at the group level increases intergroup competition (e.g., Luft & Shields, 2009), while organizing individuals into groups that serve different functions will likely decrease competition (Hogg & Terry, 2000). Relatedly, profit-sharing or other group incentives likely increase an individual's concern for the larger collective, while individual incentives decrease this concern (e.g., Kelly, 2010).

Finally, we examine the relationship between cooperation and task performance. Since each period in our experiment comprises four minutes, the more (less) time a participant spends on phase 1 of each period the less (more) time there is available to cooperate in phase 2. As such, and importantly, we measure and compare task performance per unit of time.

We find that task performance is significantly *lower* when individuals choose to cooperate versus when they choose to work only for themselves. This behavior is not wealth-maximizing and is seemingly incongruent with the signal made by choosing to cooperate that the welfare of

the collective is important. We provide evidence that the lower performance is primarily driven by the decision to cooperate rather than by differences in group identification, perceived task difficulty, or concerns about intergroup competition. Our findings highlight a potential downside to increased cooperation and underscore the importance of understanding the trade-offs that can exist when motivating increases in intergroup cooperation versus motivating maximum individual and intragroup task performance.

In sum, our findings demonstrate the importance of understanding how individuals perceive and identify with the different groups naturally present in multi-level organizations, as well as how accounting information and controls can affect, and be affected by, identification processes. Such an understanding can help firms determine the best organizational hierarchy, develop communication and control strategies to build group identification at appropriate levels, and establish evaluation and compensation systems that measure and reward outcomes without undermining individuals' valued group identities.

The remainder of this paper is organized into four sections. Section two develops our hypotheses, and section three explains the methods we employed to test our hypotheses. Section four presents our results, and section five provides a summary and discussion of the results.

2. Background and Hypotheses Development

2.1. Theory and Prior Literature

Social Identity Theory (SIT) posits that an individual's self-concept includes the attitudes, beliefs, and behaviors of the groups with which the individual identifies (Tajfel & Turner, 1979). To make sense of the social environment, individuals categorize themselves and others based on shared characteristics, drawing distinctions between members of a group with which they identify ("us") and others ("them"). The identification process shifts an individual's perspective to the

group level, increasing the salience and importance of group outcomes. As identification strengthens, individuals view themselves more as interchangeable members of the group, and the interests of the group become inseparable from the interests of the individual (Oakes, 1987; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987; Oakes & Turner, 1990). An individual's social identity usually contains multiple group identities at varying levels of inclusiveness, and is constructed in a manner that balances the need for inclusion with the need for distinctiveness (Brewer, 1991).

Much of the literature on group identification in organizational settings has focused on the positive consequences of identification, finding that stronger identifiers tend to possess higher levels of intrinsic and overall motivation for their jobs, as well as increased commitment to group goals (Hogg & Terry 2000; Haslam, 2001). Additional research finds that stronger identification leads to greater concern for other group members (e.g., Ashforth et al., 2008) and higher contributions to group outcomes in public goods settings, and may help solve other social dilemmas as well (e.g., Brewer & Kramer, 1986; Wit & Wilke, 1992; Wit & Kerr, 2002).

Research in accounting has also studied group identification effects, primarily focusing on how a single group identity affects within-group behavior and outcomes. For example, Towry (2003) finds that stronger group identification leads to increased cooperation between group members, which improves the effectiveness of a group incentive that relies on peer control. Bauer and Estep (2018) find that coordination between auditors and IT specialists is improved when their shared audit team identity is stronger, while Kelly and Presslee (2017) find that individuals' concern for members of their group is increased in the presence of stronger group identification, even when group members are in competition in a tournament setting.

Additional studies find that stronger group identification leads to other desirable behaviors, such as increased group performance (Rowe, 2004), as well as decreased professional-

organizational identity conflict, employee turnover (Bamber & Iyer, 2002), and leniency in evaluating internal controls (Stefaniak, Houston, & Cornell, 2012). Conversely, this literature also finds some undesirable behavior that stems from stronger identification, such as impaired objectivity by auditors who identify with their client group (Bamber & Iyer, 2007; Bauer, 2015), and suboptimal evaluation of specialist input by auditors who perceive a stronger shared group identity with the specialist (Estep, 2017).

We contribute to the literature in accounting and other disciplines in the following ways. First, we examine how identification with a sub-group (work team) and a superordinate group (the organization) separately and interactively affect behavior, shedding light on whether the two may serve as substitutes or complements. Since these multiple group identities naturally co-exist in firms of even moderate size, understanding the effects of identification with each group is an important issue, and one that has not been addressed in accounting research. While some research in organizational psychology has looked at effects of multiple group identities, the results are somewhat mixed (e.g., Ellemers & Rink, 2005; van Dick, van Knippenberg, Kerschreiter, Hertel, & Wieseke, 2008; Chen, Chi, & Friedman, 2013), and this research has primarily examined attitudes and perceptions of behaviors – such as job satisfaction and past tendencies to be punctual, follow rules, and follow up on customer requests – rather than intergroup cooperation.

Second, we examine the effects of identification on two outcomes – intergroup cooperation and task performance – that, to our knowledge, have not been studied together in accounting or other areas. Understanding the link between cooperation and performance is important for weighing the costs and benefits of motivating increased cooperation that may come at the expense of individual performance. Relatedly, while most research in accounting looks at how identification affects within-group behavior, we examine how identification with multiple groups

affects *between*-group behavior. Since firms are organized into many groups, intergroup cooperation – such as transfer pricing negotiations – is critical to a firm's success.

2.2. Mediating Variables – Collective Outcomes and Competition

We construct a model – pictured in Figure 1 – of the process through which we posit that multi-level group identification will affect intergroup cooperation and task performance. Before examining our specific hypotheses and research questions we first discuss the important mediating variables in our setting.

(FIGURE 1)

2.2.1. Mediating Variables – Collective Outcomes and Competition

When individuals consider the outcomes of the organization and its other members to be of importance or value, they will be more likely to choose actions that benefit the organization and its members. Research finds that this result obtains even when individuals incur personal costs for their actions (Karau & Williams, 1993; Cooper & Kagel, 2016). As such, we expect that greater concern for the outcomes of the larger collective will lead to more intergroup cooperation *(Model Link 1).*

Prior research finds that group interactions are more competitive than otherwise identical individual interactions (Wildschut, Pinter, Vevea, Insko, & Schopler, 2003). This suggests that some perceived competition is likely to be inherent in nearly all group settings, even those without explicit competition between groups. Since social interactions fall on a cooperation-competition continuum (Derlega & Grzelak, 2013), individuals' inclination to work to benefit other groups will depend on perceived competitive threats (for an accounting-related example, see Chen, Williamson, & Zhou, 2012). Based on prior literature, we expect that greater perceived intergroup competition will lead to less intergroup cooperation *(Model Link 2).*

2.2.2 Superordinate Group Identification

Stronger group identification leads to greater perceived importance of, and commitment to, group goals and outcomes (e.g., Hogg & Terry, 2000; Ashforth et al., 2008). Thus, we expect stronger superordinate group identification to result in individuals demonstrating more concern for the outcomes of the superordinate group (the organization) and its other members. Additionally, stronger superordinate group identification should increase the salience of the superordinate group categorization, which, *ceteris paribus*, will cause individuals in our setting to view members of other sub-groups within the superordinate group more as fellow ingroup members (e.g., Brewer & Kramer, 1986; Wit & Kerr, 2002). We expect this process to reduce perceptions of intergroup competition at the sub-group level, creating more of a "one team" mentality for stronger superordinate group identifiers. As such, our first hypothesis is:

> ***H1:*** *Stronger superordinate group identifiers will exhibit more frequent intergroup cooperation than weaker superordinate group identifiers.*

2.2.3. Sub-Group Identification

Self-enhancement is an important motivator of identification with groups (Tajfel & Turner, 1979; Hornsey, 2008). To enhance the self through a positive social identity, individuals aim to preserve distinctiveness for their group(s), meaning intergroup relations are shaped by perceived threats to group identity (Hornsey & Hogg, 2000a, 2000b; Hornsey, 2008). As the importance of a group identity increases to an individual via stronger identification, sensitivity to threats also increases, even absent explicit intergroup competition.

While some research suggests that this increased sensitivity to threats can lead to ingroup favoritism and contentious inter(sub)group relations (Hornsey & Hogg, 2000a, 2000b; Dovidio & Gaertner, 2010; Balliet et al., 2014), there are reasons to expect stronger sub-group identification to also lead to behavior that is congruent with a greater concern for the larger collective. Prior

research finds that identification with sub-groups – due to the decreased abstractness of the group identity and the (typically) more frequent enactment of the group identity – tends to be stronger and more salient than identification with superordinate groups (Riketta & van Dick, 2005; Ashforth et al., 2008). The effects of this identification may project to the superordinate group identity, such that individuals view the superordinate group as the vehicle through which they can express their valued sub-group identity, meaning the two identities are critically connected in a way that the continued welfare of the sub-group depends on the existence and welfare of the superordinate group (e.g., Ashforth & Johnson, 2001; Ashforth et al., 2008). This would lead to attitudes and behavior that show greater concern for the superordinate group in order to protect the sub-group by association. As such, in the absence of explicit competition between groups, we expect stronger sub-group identification to lead to more intergroup cooperation.

> ***H2:*** *Stronger sub-group identifiers will exhibit more frequent intergroup cooperation than weaker sub-group identifiers.*

2.2.4. Interaction between Multiple Group Identities

In organizational settings, the most salient groups to an individual are likely to be their immediate work-group (sub-group) and the organization itself (superordinate group). Despite the natural co-existence of these multiple group identities, the potential interactive effects of the two have not been examined in prior accounting research. Research in other disciplines has also been scant (see Ellemers & Rink, 2005; van Dick et al., 2008; Chen et al., 2013) and has not examined interactive effects on intergroup cooperation and performance, outcomes that are of great importance to firms' success.

Theory and research suggest that individuals' behavior when two group identities are salient in a social context will depend on the extent to which the desired outcome for the situation differs with respect to the two identities (Hornsey & Hogg, 2000a, 2000b; Riketta & van Dick,

2005; Dovidio & Gaertner, 2010). In our setting, since we expect stronger superordinate and sub-group identification to result in greater concern for collective outcomes and increased cooperation, there exists little conflict between the two identities.

As such, we expect the congruence between the two identities to create a situation where the identities recursively reinforce each other with respect to desired outcomes they share in common (e.g., Ashforth & Johnson, 2001), thus leading to an amplification of the effects of identification with each group on these outcomes. The result is individual perceptions and behavior that are of a greater magnitude than would be observed if stronger identification with the two groups were additive in nature.

The congruence between stronger superordinate and sub-group identification along most dimensions leads to a high degree of overall consistency in individuals' self-concepts (e.g., Ashforth & Johnson, 2001; Hornsey, 2008). Moreover, stronger identification with both groups will better satisfy individuals' simultaneous desire for inclusion and distinctiveness than identification with only one group level (Brewer, 1991), as individuals can maintain their unique sub-group identity within the umbrella of the valued superordinate group. These effects will lead to a greater sense of overall well-being and satisfaction with the group environment than could be provided by stronger identification with just one of the two groups (Brewer, 1991; Hogg, 2007; Hornsey, 2008), resulting in even stronger positive feelings toward the groups and the group environment. For these reasons, we expect an interaction between stronger superordinate and sub-group identification such that each will amplify the positive direct effect of the other on intergroup cooperation.

> ***H3:*** *Differences in intergroup cooperation between weaker and stronger sub-group identifiers will be magnified in the presence of stronger superordinate group identification.*

We summarize the expected effects of superordinate group identification, sub-group

identification, and their interaction on intergroup cooperation in Figure 2.

(FIGURE 2)

2.2.5. Group Identification, Cooperation, and Task Performance

Participants in our experiment completed four identical four-minute work periods in which they decoded strings of letters into numbers. In the first phase of each period, participants decoded eight strings, which in pre-testing took an average of one and a half minutes to complete. To recognize that output of an individual's immediate work-group is important in an organizational setting, total welfare was $0.30 for each string correctly decoded, with the individual and each member of their sub-group receiving $0.10 each. In the second phase, participants spent any remaining time completing additional decoding after indicating their decision to have that work benefit either: themselves alone at a rate of $0.10 per string, or themselves and a different sub-group of their choosing at a rate of $0.05 to the individual and $0.05 to each of the three members of the other sub-group (total welfare = $0.20).

Since work periods are split into two phases but fixed in duration at four minutes, we measure performance as the amount of decoding work completed per unit of time (minute). Using this measure, rather than absolute decoding output, allows us to examine differences in performance: (1) *between* participants on post-decision work, regardless of how long it took each participant to complete their pre-decision work, and (2) *within* participants between pre- and post-decision work, since the amount of time available to work is likely unequal between the two phases of the period.

The decision to cooperate *per se* may decrease performance. Research suggests that individuals may use "moral wiggle room" to act in their self-interest when they have conflicting motivations (Dana, Weber, & Kuang, 2007; Haisley & Weber, 2010), or may engage in

cooperative behavior out of feelings of obligation rather than an altruistic desire to benefit others (e.g., Cain, Dana, & Newman, 2014). This research suggests that individuals performing a kind, prosocial act may engage in more self-regarding subsequent behavior because they can more easily justify that behavior. In our setting, this creates two possibilities in which individuals choosing to cooperate may exhibit lower performance. First, individuals may feel that the greater per-unit total welfare created by cooperative effort ($0.20), as compared to non-cooperative effort ($0.10), allows them to achieve acceptable compensation for the collective with less output (effort). Second, individuals who satisfy a desire to act in a prosocial manner by choosing to cooperate may not feel that the lower individual piece-rate compensation for that effort is as appealing, and may therefore reduce effort accordingly.

Conversely, choosing to cooperate may increase performance. Since piece-rate compensation to the individual is half as much for cooperative work as it is for non-cooperative work, individuals making this choice may feel that they need to exert *more* effort in order to obtain compensation that is closer to what they would have earned if they had chosen to work for themselves. Alternatively, individuals recognizing that the collective return to their effort when cooperating is twice that of the return to their effort when working just for themselves may be motivated to exert more effort to maximize collective welfare. Either of these two motivational forces would cause cooperative performance to be greater than non-cooperative performance. Given the opposing reasons described above, we examine as a research question whether the decision to cooperate leads to differences in performance.

RQ 1*: Does the decision to cooperate affect task performance?*

Any effect of group identification (sub- or superordinate group, or the interaction between the two) on task performance in our setting may be subsumed by the relation between identification

and the decision to cooperate. Moreover, some prior research finds no differences in performance as a function of identification, if – for example – individual performance-based incentives are strong enough to motivate effort (Kerr & Tindale, 2004; Balliet et al., 2014). On the other hand, intrinsic motivation on collective tasks has been shown to be affected by one's relatedness to others in the collective (Tauer & Harackiewicz, 2004). Consistent with this notion, some research finds that groups containing stronger identifiers exhibit greater task performance than groups without such members (Hogg & Terry, 2000; van Knippenberg, 2000; Riketta, 2005; Ashforth et al., 2008), leaving the possibility that group identification will directly increase performance in our setting. Since the competing potential effects of group identification on task performance result in different predictions, we examine these relations as a research question.

RQ 2: *Does group identification affect task performance?*

3. Method

3.1. Design & Participants

To study the effects of multi-level group identification on intergroup cooperation and performance, we conduct a 2 (sub-group identification: stronger or weaker) × 2 (superordinate group identification: stronger or weaker) × 4 (periods) mixed factorial design experiment. Sub-group identification and superordinate group identification were manipulated between-participants, and the multiple periods of the experiment resulted in within-participants repeated measures of the dependent variables. Two hundred and sixteen individuals from Amazon's Mechanical Turk (MTurk) internet marketplace were recruited for the experiment through a publicly announced Human Intelligence Task (HIT). MTurk workers were deemed eligible to participate in the experiment as long as they had a historical HIT approval rating of 98 percent or higher and were based in the United States. Participants were paid a $1.00 participation fee, as

well as additional compensation as outlined below, to complete the experiment. Total compensation averaged $4.87 across all conditions.[2]

As part of the MTurk recruitment materials, participants were informed that they should begin the experiment at the pre-determined date and time noted in the MTurk HIT assignment.[3] Participants were further informed that their work in the experiment would involve completing a task while working as part of a group of three individuals (this serves as the participant's sub-group), and that their group also belonged to a company that was comprised of their group and two other groups of equal size (the company serves as the participant's superordinate group). It was made clear to participants that they would not be interacting with their other group members, or members of other groups, during or after the experiment. Participants completed the experiment by visiting a link provided to them via the MTurk website, which directed them to a web application containing all experimental materials.[4]

3.2. Task & Manipulations

The experimental task involved the decoding of strings of letters, five characters in length, into numbers using a decoding key provided on-screen.[5] Strings were generated for use in the experiment using a random draw of the letters A-P for each of the five characters in each string (with replacement), and decoding values for each letter were generated using a random draw of

[2] Research finds that the typical MTurk worker is willing to work for about $1.38 per hour (Paolocci, Chandler, & Ipeirotis, 2010). The average compensation in this study of $4.87 equates to more than $7.00 per hour, which is above conservative estimates of effective wage rates (Farrell, Grenier, & Leiby, 2017).

[3] Since the experiment required no interaction between group members, we avoided some of the potential pitfalls of group studies in an online environment (e.g., occasional drop-outs, or participants working at different paces) by forming groups post-hoc for purposes of determining compensation. To do so, we randomly assigned each of the 54 participants in each condition to a group (consisting of three individuals), and then randomly assigned each group to a company (consisting of three groups), consistent with the organizational structure noted in the experimental materials. The scheduled start time was intended to increase the salience of the group aspect of the study. Moreover, and as participants were informed, there was no deception present in any part of the experiment.

[4] The web application was programmed using the oTree platform (Chen, Schonger, & Wickens, 2016).

[5] The task is loosely adapted from prior studies, such as Chow (1983) and Waller and Chow (1985).

the numbers 1-26 (without replacement). Participants completed one three-minute practice period and four four-minute work periods, during which they worked on the decoding task to earn compensation as described in the procedures below.[6]

To achieve equal groups while allowing participants to complete the experiment at their own pace, participants were assigned to one of the four experimental conditions – in succession – upon entering the online instrument. Following research in accounting and psychology that uses descriptions of hypothetical task or decision environments to induce certain attitudes (e.g., Haslam, 2001; Wyer, Adaval, & Colcombe, 2002; Reis & Judd, 2014; Christ & Vance, 2018), both sub-group identification and superordinate group identification were manipulated through the use of context-rich narratives describing the participant's assigned group and company. Specifically, participants were told to assume that for the duration of the experiment, they were an employee of either Dynamatic Company (stronger superordinate group identification) or Zenadrone Company (weaker superordinate group identification), and that they were a member of Group Proton (stronger sub-group identification) or Group Nulliset (weaker sub-group identification).[7]

The company and group narratives were constructed with the goal of inducing general awareness of one's membership in each group, combined with stronger or weaker affective (i.e. emotional involvement with the group) and evaluative (i.e. positive or negative value connotation associated with the group) identification with each group or company, as appropriate for each condition. Literature in psychology and organizational behavior describe identification as happening along a continuum, rather than being an "on/off" switch (e.g., Tajfel & Turner, 1979;

[6] To control for any differences in the decoding difficulty of individual letter strings, all participants received the same sets of strings in any single round.

[7] Company and group names – and the logos used to represent them in the online instrument – were chosen to be consistent with the appropriate identification valence. For example, the name "Zenadrone Company" is generic and relatively cold in nature, and its logo of an abstracted toxic waste symbol should at the least not generate any positive feelings or attraction in participants. See Appendix A for sample narratives and organizational charts.

Hogg & Terry, 2000; Ashforth et al., 2008). Given this consideration, and the fact that individuals approach social settings with differing likelihoods of identification (Tajfel & Turner, 1979; Turner et al., 1987), our manipulations are intended to move participants along the continuum of identification in the intended direction (stronger or weaker), rather than to reach some particular level of identification.

Company descriptions included mentions of the organizational culture, mission/values, and perceptions of the firm by outsiders. Care was taken to ensure an approximate balance between conditions in terms of the amount of information presented, such that for each characteristic employed to manipulate identification, Dynamatic received a "positive" version and Zenadrone received a "negative" (or "neutral") version. The same general approach was used for the descriptions of Group Proton and Group Nulliset in order to manipulate sub-group identification. These descriptions included mentions of the manner in which the individual joined the group, group management style, and other group characteristics.[8] Within the group and company narrative information, participants were also shown an abbreviated organizational chart that further illustrated the nesting of their group within their company, as well as the presence of the other two (nameless) groups in their company.

3.3. Procedures

The experiment consisted of four parts: (1) instructions and a brief quiz to test participants' understanding of the instructional materials, (2) a three-minute practice period to allow participants to become familiar with the experimental task, (3) four four-minute work periods during which

[8] Following prior research (Haslam, 2001; Reis & Judd, 2014), our manipulation of identification is multi-dimensional. The elements included in our narratives were all chosen because of their demonstrated predictive power for one's group identification in prior research (Haslam, 2001; Riketta & van Dick, 2005; Ashforth et al., 2008). Since we are interested in the overall effects of identification on subsequent perceptions and behavior, rather than any particular determinant of stronger identification, our design reflects that goal.

participants worked on the experimental task in order to earn additional compensation beyond their participation fee, and (4) a post-experiment questionnaire (PEQ).

In the first part of the experiment, participants reviewed instructions that further explained the group and company setting (as described earlier) and were presented with narratives intended to manipulate sub-group and superordinate group identification. Participants were then provided with detailed information pertaining to the experimental task, potential compensation (including examples), and the operation of the practice period and work periods.

Each period operated in the following manner. Participants were presented with an initial allocation of eight letter strings to decode and were provided with an on-screen timer that counted down the time remaining in the period.[9] After submitting their work, participants' time was paused, and they were presented with two options. They could: (1) work on additional decoding that would earn compensation for themselves and the members of another group within their company, or (2) work on additional decoding that would earn compensation for themselves only.[10] If they chose the first option, participants were able to select which of the other two groups in their company they wished to benefit with their work (see Appendix A for screenshots of the experimental instrument) and were then presented with additional letter strings they could work on decoding until their time expired. If they chose the second option, participants were presented with additional letter strings they could work on decoding until their time expired.[11]

Participants earned compensation based on the letter strings they – and others – correctly

[9] In pre-testing, individuals were able to decode the first eight strings in an average of approximately one minute and thirty seconds. Therefore, the four-minute duration of the work periods should create a setting in which participants have more than half of their time each period to earn compensation in the manner they choose.

[10] The instructions explained that all work completed for the benefit of other groups would not be made known to the recipients until the conclusion of the experiment, and would remain anonymous even then. This was done to control any expectations of reciprocity that may factor into participants' decision-making.

[11] To remove explicit competition from our setting, participants received no individual or group performance feedback during or after the first, second, or third work periods. Following the PEQ, participants were given individual performance information for the randomly-selected compensation period.

decoded in a randomly selected work period. For each string correctly decoded from the initial allocation of eight strings, participants received \$0.10, and each of their sub-group members received \$0.10. If they chose to work for the benefit of themselves and another group in the second part of the period, participants received \$0.05 for each correctly decoded string, and each member of the group chosen to benefit from this work also received \$0.05. Finally, if they chose to work for the benefit of themselves alone in the second part of the period, participants received \$0.10 for each correctly decoded string, making cooperation personally costly.[12]

Participants completed a practice period and four work periods as just described, and were then directed to the post-experiment questionnaire. The questionnaire contained several items related to participants' identification with both their group and their company (see Appendix B for a complete listing of these items) that were adapted from prior literature (e.g., Ashforth & Mael, 1989; Haslam, 2001; Riketta, 2005; Riketta & van Dick, 2005). Additional questions asked participants about their motivation(s) for their decisions to work for the benefit of other groups (e.g., concerns about total payoffs, perceived competition) or not, as well as their potential concerns for their own group members.

4. Results

4.1. Group Identification

The PEQ contained items designed to measure participants' identification with their assigned group (representing the sub-group factor) and company (representing the superordinate group factor). These items were all scaled from 1 ("Strongly disagree") to 5 ("Strongly agree") –

[12] While cooperation is costly to the individual, overall welfare is higher – which is designed to capture cooperative synergies often present in organizations. For each string correctly decoded in a period in which the individual chooses cooperation, the total payoff is \$0.20 (\$0.05 to the individual, and \$0.05 × 3 = \$0.15 to the group the individual chooses to benefit). This compares to a total payoff of \$0.10 (all to the individual) in periods in which the individual chooses to benefit themselves with their additional work.

and three (two) of the five in each group referenced elements of identification where stronger agreement (disagreement) with the statement signaled stronger identification (See Appendix B). To examine the effectiveness of the experimental manipulations, we construct identification scores for the sub-group and superordinate group by taking an average of the five questions for each factor, reverse-scoring questions where identification hinged on disagreement.[13]

As illustrated in Table 1, the mean sub-group identification score for participants in the stronger sub-group identification conditions (3.13) is significantly greater ($p < 0.01$) than the mean score for participants in the weaker sub-group identification conditions (2.70), which provides evidence of successful manipulation of sub-group identification. Similarly, the mean superordinate group identification score for participants in the stronger superordinate group identification conditions (3.06) is significantly greater ($p < 0.01$) than the mean score for participants in the weaker superordinate group identification conditions (2.55), providing evidence that the superordinate group identification manipulation was successful.

(TABLE 1)

4.2. Descriptive Statistics

Table 2 presents descriptive statistics related to the portion of compensated rounds in which participants chose to cooperate with other groups, as well as participants' overall task performance, while Figure 3 provides a graphical representation of these outcomes across conditions. As can be seen in Table 2 and Figure 3, the differences in cooperation observed between stronger and weaker sub-group (cooperation in 33 percent and 15 percent of compensated rounds, respectively) and

[13] For this and subsequent analyses, we exclude 12 participants who failed one or more of three manipulation/attention checks present in the PEQ. These checks required participants to: (1) select their group and (2) company names from separate lists of three names, where the two incorrect responses would not have been seen anywhere in the experiment, and (3) provide the correct response to the following item: "Please select '5' to show that you are paying attention." Including these 12 participants leaves general inferences unchanged.

stronger and weaker superordinate group (cooperation in 27 percent and 21 percent of compensated rounds, respectively) identification conditions suggest the presence of possible main effects of sub-group and superordinate group identification, as well as a potential interactive effect between the two, on an individual's likelihood of choosing to cooperate. We formally examine these results in our subsequent hypothesis tests.

(TABLE 2 and FIGURE 3)

The results for task performance by condition appear to be nearly opposite to those observed for cooperation. As can be seen in Table 2 and Figure 3, differences in task performance between stronger and weaker superordinate group identification conditions (5.38 vs. 5.64, significantly different at $p < 0.05$) and stronger and weaker sub-group identification conditions (5.37 vs. 5.66, significantly different at $p < 0.05$) suggest possible negative main effects of superordinate group identification and sub-group identification, as well as a possible negative interactive effect of the two factors, on overall task performance.

With regard to the decision to cooperate, untabulated results find that performance in cooperative rounds (4.72) is lower ($p < 0.01$) than performance in non-cooperative rounds (5.76) across all participants, suggesting the pattern of overall performance results in Figure 3 may be driven – at least in part – by the differences in the frequency of cooperation observed between conditions.[14] As such, Figure 4 presents task performance by superordinate and sub-group identification conditions, separately for cooperative vs. non-cooperative rounds. While there appears to be little to no difference in performance between conditions in non-cooperative rounds,

[14] This result holds for work completed as part of the initial work allocation (4.78 vs. 5.79, $p < 0.01$) and work completed after making the decision to cooperate (4.65 vs. 5.73, $p < 0.01$), an effect we discuss in more detail below. In addition, there are no significant performance differences between work completed as part of the initial work allocation and work completed after making the decision to cooperate in either cooperative (4.78 vs. 4.65, $p = 0.57$) or non-cooperative (5.79 vs. 5.73, $p = 0.56$) rounds.

Figure 4 suggests there may be potential differences in performance in cooperative rounds. We further examine task performance results in tests of our research questions below.

(FIGURE 4)

4.3. Tests of Hypotheses & Research Questions

4.3.1. Test of Hypothesis 1 (H1) – Superordinate Group Identification

H1 predicts that stronger superordinate group identifiers will exhibit more frequent intergroup cooperation than weaker superordinate group identifiers. To test H1, we estimate a logistic regression model with *Cooperation* as the dependent variable, *StrongSuperID* as the independent variable, and *Gender*, *TaskDiff* and *InitialWork* as the control variables. *Cooperation* equals one (zero) if a participant chose to cooperate (not cooperate) with another sub-group during the period. *StrongSuperID* is an indicator variable that equals one (zero) if a participant was randomly assigned to the stronger (weaker) superordinate group identification conditions. *Gender* is used as a control variable, based on prior research that provides evidence of less intergroup, and more intragroup, cooperation from males than females (Balliet et al. 2014).[15] We also include task difficulty (*TaskDiff*) as a control variable, and expect that higher perceived difficulty will lead to increased cooperation in our setting due primarily to an effect of dependency-creating assistance suggested in prior research (Hornsey and Hogg 2000b; Yzerbyt and Demoulin 2010). The third control variable included (*InitialWork*) is the participant's work efficiency – number of letter strings correctly decoded per minute – during the pre-decision portion of the work period. As noted in the previous discussion of our research question, there may be differences in effort provided by participants in cooperative versus non-cooperative rounds, and controlling for a measure of initial work efficiency allows us to separate the effects

[15] Consistent with Balliet et al.'s (2014) general finding of less intergroup cooperation from males than females, male participants in our experiment cooperated less often than female participants across all conditions ($p < 0.01$).

of group identification from other factors that may be influencing behavior.

The results of our test of H1 are presented in Model (1) of Table 3. As shown in Model (1), we find a marginally significant positive effect of superordinate group identification ($p = 0.10$), providing some support for H1.

(TABLE 3)

4.3.2. Test of Hypothesis 2 (H2) – Sub-Group Identification

H2 predicts that stronger sub-group identifiers will exhibit more frequent intergroup cooperation than weaker sub-group identifiers. To test H2, we estimate a logistic regression model with *Cooperation* as the dependent variable, *StrongSubID* as the independent variable, and *Gender*, *TaskDiff* and *InitialWork* as the control variables, which are defined as in our tests of H1.

The results of our test of H2 are presented in Model (2) of Table 3. Model (2) reveals that the coefficient on our variable of interest, *StrongSubID* is positive and significant ($p < 0.01$), providing support for H2. Moreover, our results suggest that the odds of cooperating with another sub-group are 2.74 times higher in the stronger sub-group identification conditions than in the weaker sub-group identification conditions.

4.3.3. Test of Hypothesis 3 (H3) – Interaction

While H1 and H2 predict main effects of sub-group and superordinate group identification on individuals' decisions to cooperate with other groups, H3 predicts an interaction between the two factors such that differences in intergroup cooperation between weaker and stronger sub-group identifiers will be magnified in the presence of stronger superordinate group identification. To test H3, we estimate a logistic regression model with *Cooperation* as the dependent variable, *StrongSubID*, *StrongSuperID*, and *StrongSubID*×*StrongSuperID* as

independent variables. All variables are defined as described for our previous tests of H1 and H2.

The results of our test of H3 are presented in Model (3) of Table 3. As shown in Model (3), the coefficient for the interaction variable *StrongSubID*×*StrongSuperID* is positive, but not significant ($p = 0.37$), which does not support H3. While the coefficient on the interaction term in Model (3) is not significant, a contrast test using contrast coefficients of -2, -1, 1, and 2 for (sub-group-superordinate group) weaker-weaker, weaker-stronger, stronger-weaker, and stronger-stronger conditions (consistent with the pattern predicted in our hypotheses), indicates a significant interaction between sub-group identification and superordinate group identification (odds ratio = 3.37, $p < 0.01$).

4.3.4. Research Questions – Task Performance

Our research questions address potential differences in performance as a function of group identification and the decision to cooperate. Given the differences in performance between cooperative and non-cooperative rounds for the average participant and the differences in frequency of cooperation across conditions, isolating any effect of superordinate or sub-group identification on performance requires analysis that is conditional on one's decision to cooperate. Untabulated t-tests find that performance by participants in weaker sub-group identification conditions (5.84) is marginally significantly ($p = 0.10$) greater than performance by participants in stronger sub-group identification conditions (5.65) in non-cooperative rounds only, while performance by participants in weaker superordinate group identification conditions (5.25) is significantly ($p < 0.01$) greater than performance by participants in stronger superordinate group identification conditions (4.30) in cooperative rounds only.

Table 4 more formally examines our research questions. Model (1) in Table 4 reveals that the decision to cooperate negatively affects participants' task performance (RQ1), but that neither

sub-group nor superordinate group identification affect task performance (RQ2). These results suggest that the effect of one's decision to cooperate on performance dominates the effects of sub-group and superordinate group identification, or serves as the mechanism through which identification affects performance. Given that differences in average performance between cooperative and non-cooperative rounds are observed in both phases of the round, as discussed earlier, it appears that participants make the decision to cooperate prior to starting the round (in anticipation of the decision point), and the reduction in effort observed for most participants on post-decision work thus spills forward to affect work completed prior to indicating their decision to cooperate. We note that the model controls for perceived task difficulty, which coupled with the fact that participants receive no individual or group performance feedback during or after work periods, suggests individuals' decisions to cooperate and their task performance are not based simply on ability or concerns about group competition. Model (2) and Model (3) provide insight into what might be driving the reduction in task performance. Including the *CoopSynergy* variable, which measures how much the synergy of cooperation affected participants' decision to cooperate, results in an insignificant effect of *Cooperation* ($p = 0.55$), and a negative effect of *CoopSynergy* ($p < 0.01$), on task performance. These results suggests that individuals' lower performance when cooperating is due to their recognition of the greater per-unit welfare of cooperative effort.

(TABLE 4)

To further disentangle performance effects resulting from the decision to cooperate, we examine results for 49 participants who chose to cooperate in at least one, but not all, of their four work periods. Doing so allows us to use these participants as their own control group in looking for any differences in performance between cooperative and non-cooperative rounds. In untabulated results, we find that overall performance by these individuals is lower in cooperative

rounds (4.71) as compared to non-cooperative rounds (4.98). To test the significance of this potential effect while controlling for other individual factors that may affect performance, we construct a linear regression model of the following form: $Task\ Performance = \alpha + \beta 1 Cooperation + \beta 2 Gender + \beta 3 TaskDiff + \varepsilon$. Results show a significant intercept (4.06, p = 0.03), and a marginally significant coefficient on *Cooperation* (-0.34, p = 0.10), providing additional evidence that the decision to cooperate has a negative impact on task performance.

Finally, all results described above are inferentially identical if using participants' efficiency on initial work allocations as the measure of task performance, which lends additional support to the notion that participants appear to be making decisions to cooperate prior to beginning each round, and that this decision affects their task performance in *both* phases of the round.

4.4. Generalized Structural Equation Model (GSEM)

In order to provide a more complete picture of the effects of sub-group identification and superordinate group identification on individuals' decisions to cooperate *and* their subsequent task performance, as well as potential mediating effects, we construct a generalized structural equation model (GSEM).[16] The model includes the binary decision to cooperate (*Cooperation*) as a dependent variable of sub-group identification, superordinate group identification, and their interaction, as well as potential mediating factors suggested by theory.[17]

(FIGURE 5)

[16] Given that the *Cooperation* variable is binary, all links (paths) to this variable were specified as probit regression links, whereas links between other continuous variables (sub-group identification, superordinate group identification, the interaction term, concern for the larger collective, perception of intergroup competition, and task performance) were specified as the equivalent of linear regression links.

[17] Overall, the model is an excellent fit for the data, with an insignificant (p = 0.34) chi-square test, and all other measures of fit (error) above (below) generally accepted levels (CFI = 0.99; TLI = 0.98; RMSEA = 0.01) (Kline, 2011).

4.4.1. Mediating Variables – Collective Outcomes and Competition

As can be seen in Figure 5, we find that *Collective* has a positive effect on *Cooperation* (Link 1, 0.62, $p < 0.01$), and find that *Competition* has a negative effect on *Cooperation* (Link 2, -0.11, $p < 0.05$), which suggests that higher levels of perceived intergroup competition are detrimental to intergroup cooperation.

4.4.2. Superordinate and Sub-Group Identification

As expected, we find that superordinate group identification exhibits a positive effect on *Collective* (Link 3, 0.17, $p < 0.05$), as well as a negative effect on *Competition* (Link 4, -0.27, $p < 0.01$). We observe no significant direct effect of superordinate group identification on the decision to cooperate (Link 5, 0.02, $p = 0.38$). However, the total effect of superordinate group identification on *Cooperation* is positive and significant (Link 5 + total indirect effect = 0.15, $p < 0.05$), suggesting that the effect of superordinate group identification on the decision to cooperate is fully mediated by *Collective* and *Competition*.

Regarding the effect of sub-group identification on one's decision to cooperate, as well as the process through which that effect occurs, Figure 5 reveals that sub-group identification has a positive effect on *Collective* (Link 6, 0.57, $p < 0.01$) and a positive effect on *Competition* (Link 7, 0.15, $p = 0.09$), resulting in a positive total indirect effect on *Cooperation* (Link 6×Link 1 + Link 7×Link 2, 0.34, $p < 0.01$). We also find that sub-group identification has a positive direct effect on *Cooperation* (Link 8, 0.32, $p < 0.01$), which, when combined with the indirect effects just described, results in a positive total effect of sub-group identification on Cooperation (0.65, $p < 0.01$). These results suggest that the effect of sub-group identification on the decision to cooperate is partially mediated by *Collective* and *Competition*, and its magnitude (0.65, as compared to 0.15 for superordinate group identification) suggests that stronger sub-group identification is more

critical to motivating intergroup cooperation than stronger superordinate group identification.

Finally, as can be seen in Figure 5, we find no significant effects of the interaction term on our mediating variables – *Collective* (Link 9) and *Competition* (Link 10). However, we find a positive direct effect of the interaction term on *Cooperation* (Link 11, 0.11, p = 0.08), which leads to a total effect that is positive and marginally significant (Link 11 + total indirect effect = 0.10, p = 0.09).

In summary, 8 of the 11 links in our GSEM relating to cooperation are significant, or marginally significant, and consistent with predictions. These results provide a more complete picture of the direct and indirect effects of superordinate and sub-group identification on an individual's decision to cooperate. Importantly, our model highlights the relative strength and interactive nature of superordinate and sub-group identification in motivating one type of intergroup behavior (cooperation), as well as two fundamental mechanisms through which this influence occurs.

4.4.3. Research Questions – Task Performance

Consistent with our earlier regression results, our GSEM in Figure 5 shows no significant (all p's > 0.36, two-tailed) direct effects of superordinate group identification (Link 13), sub-group identification (Link 14), or the interaction between the two (Link 15) on participants' task performance. However, there are negative indirect effects of superordinate group identification (-0.05, p = 0.06), sub-group identification (-0.23, p < 0.01), and the interaction term (-0.04, p = 0.10) on task performance.[18] These results are attributable to the highly significant negative effect of the decision to cooperate on task performance (Link 12, -0.34, p < 0.01), and suggest that

[18] Note that indirect effects on task performance operate through *Collective*, *Competition*, and *Cooperation*. For example, the indirect effect of superordinate group identification on task performance is determined in the following manner: (Link 5×Link 12) + (Link 3×Link 1×Link 12) + (Link 4×Link 2×Link 12).

superordinate and sub-group identification thus affect task performance *through* the decision to cooperate.

5. Conclusion

We conduct an experiment to study the process through which multi-level group identification affects intergroup cooperation and performance. We find that stronger superordinate and sub-group identification – separately and interactively – increase intergroup cooperation, and that these effects are mediated by a concern for the larger collective and perceptions of intergroup competition. We also find that task performance is lower when individuals choose to cooperate, as compared to when they choose to work only for themselves, and provide evidence that this effect stems from the decision to cooperate itself rather than from group identification or other factors.

Our findings make several contributions. Since greater decentralization has been shown to strengthen sub-group identification (Ashforth et al., 2008), our finding of more frequent cooperation by stronger sub-group identifiers highlights a potential benefit to decentralization, in addition to the others noted by prior research (e.g., Indjejikian & Matějka, 2012). Furthermore, our finding of increased cooperation from stronger superordinate group identifiers suggests that firms may benefit from adopting communication and control strategies that highlight collective identities, provided those efforts do not threaten valued sub-group identities.

Our finding of a positive interactive effect between stronger sub-group and superordinate group identification on intergroup cooperation highlights a benefit of greater congruence between lower-level (sub-group) and higher-level (superordinate group) goals. Greater alignment is likely to lead to stronger identification with both groups and, as such, organizations may be able to achieve desired intergroup outcomes without costly controls designed to motivate that behavior. Relatedly, our finding of lower task performance when individuals choose to cooperate suggests

that firms may face a trade-off in motivating increased intergroup cooperation versus maximum individual performance.

By examining how one's multiple group identities separately and interactively influence intergroup cooperation and performance, we extend prior group identification research in accounting (e.g., Towry, 2003; Rowe, 2004; Kelly & Presslee, 2017; Bauer & Estep, 2018) that has primarily focused on the effects of a single shared group identity on intragroup behavior. Moreover, we contribute to the literature by exploring the relationship between cooperation and task performance, an important issue that has not been previously studied. Finally, we extend literature in psychology and organizational behavior that has examined the effects of multiple identities on other outcomes, such as job satisfaction and tendencies to follow rules (e.g., van Dick et al., 2008; Chen et al., 2013).

Our study also suggests some avenues for future research. For example, participants in our study were not provided with individual or group performance feedback. Future research could examine how absolute or relative feedback changes individuals' immediate behavior, as well as their perceptions of our critical mediating variables – intergroup competition and a concern for the larger collective. It is possible that group-level feedback could increase perceptions of intergroup competition, and may also interact with identification to change cooperative behavior.

APPENDIX A

Sample narratives

Weaker sub-group identification

You have been a member of **Group Nulliset** for the past year, having been assigned to the group as part of a company-wide reorganization. As part of the reorganization process, you were asked for your group preferences based on your past experiences as a member of the company, and Group Nulliset was your third choice due primarily to your lack of interest in the group's functional purpose. Group Nulliset does perform multiple tasks within the company, but none that you believe allow you to make use of your current skillset. From the time you joined Group Nulliset, you have felt that your contributions and opinions are not highly valued or respected by other group members or the group's manager. In addition, this manager tends to micro-manage group members, delegating tasks but describing how each task should be completed and following up to make sure it is completed in exactly that manner.

Excessive group member turnover in the past year – which does not seem concerning to the group's manager – has caused a backlog of work, requiring you to maintain long work hours, usually in excess of 55 hours per week. Group Nulliset team members are not permitted to work remotely at any time, and must commute to Dynamatic's annex facility, a converted warehouse that is 45+ minutes from your home (considering traffic). The projects you work on are often cancelled or changed mid-way through completion, and most of them seem to have no clear link to Dynamatic's company-wide goals. Dynamatic's CEO has made it clear that the types of work Group Nulliset performs are a "necessary evil," and has mentioned several times in company-wide communication that the performance of groups involved in such tasks has been unsatisfactory.

Please proceed to the next page to complete a brief knowledge check regarding the instructions and information you just read.

Stronger sub-group identification

You have been a member of **Group Proton** for the past two years, having joined the group at the same time as one of your good friends from the associate trainee program. Group Proton performs a variety of tasks for the company, and you believe that your role in Group Proton allows you the opportunity to do what you do best each day. From the time you joined Group Proton, you have felt that your contributions and opinions are valued and respected by other group members and the group's manager. You are given assistance when needed, but you are otherwise free to work independently without being micro-managed. Working in Group Proton allows you to maintain a flexible work schedule, and you can work remotely at times if you choose to.

Each member of Group Proton seems to have a clear understanding of how their work fits together with the goals of the group, and with Dynamatic's goals in general. Dynamatic's CEO has recognized your group for its outstanding work on a number of occasions, and you believe the company truly appreciates the contributions of your group. Two of Group Proton's former managers have attained executive-level positions within the company, so you feel Group Proton's visibility opens up advancement opportunities for you as your career progresses.

Please proceed to the next page to complete a brief knowledge check regarding the instructions and information you just read.

Weaker superordinate group identification

For the duration of the experiment, assume you are an employee of **Zenadrone Company**. Zenadrone is a medium-sized firm with offices in a number of locations that provides consulting services to its customers across several functions – including technology, accounting/finance, operations, and environmental services. Zenadrone is widely known for its corporate culture that emphasizes a focus on bottom-line profits and little else. Zenadrone executive leadership generally expects employees to work as much as necessary to achieve the company's lofty objectives, even if that means spending seven days per week in the office. Dozens of former and current employees have reported that this hard work is not often rewarded appropriately, and that to get ahead at Zenadrone one must be on the right side of ongoing office politics.

Leadership views employees as easily replaceable, and in fact the company relies on a relatively high amount of employee turnover to maintain low salary costs by replacing exiting employees with lower-cost new hires. Zenadrone has faced some public scrutiny for these questionable human resource policies, though these concerns have recently been overshadowed by a class-action lawsuit filed against the company for alleged wrong-doings in the environmental services consulting business, where Zenadrone is reported to have advised clients on how to avoid civil penalties incurred for dumping toxic waste in eight different countries.

Zenadrone hired you a few years ago as part of its associate trainee program. During your new hire orientation, Zenadrone's CEO, Abbie Smith, spoke briefly to all the new hires to highlight the importance of the "profitability first, last, and always" mentality that Zenadrone believes is necessary for success in the consulting industry. Zenadrone has been moderately profitable since you joined the company, though executive leadership has claimed that the company continues to fall short of cost-cutting goals and needs to continue to save costs wherever possible. The partial organizational structure of Zenadrone is shown below:

Stronger superordinate group identification

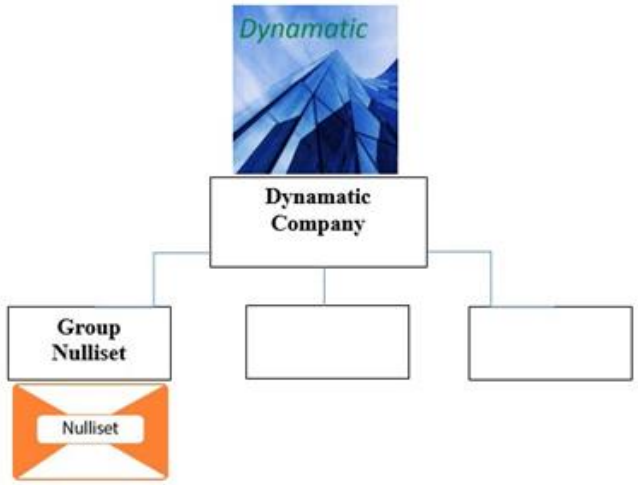
For the duration of the experiment, assume you are an employee of **Dynamatic Company**. Dynamatic is a medium-sized firm with offices in a number of locations that provides consulting services to its customers across a number of functions – including technology, accounting/finance, operations, and environmental services.

Dynamatic takes pride in employing a diverse workforce, and maintaining an environment where individuals' work-life balance is both valued and encouraged. That emphasis has paid off, as Dynamatic was recently designated one of Fortune magazine's "50 Best Places to Work," an honor they have received for five consecutive years. Fortune magazine's company review also named Dynamatic one of the "100 Most Socially Responsible Companies," primarily due to Dynamatic's work in environmental services consulting and its continued involvement in local communities.

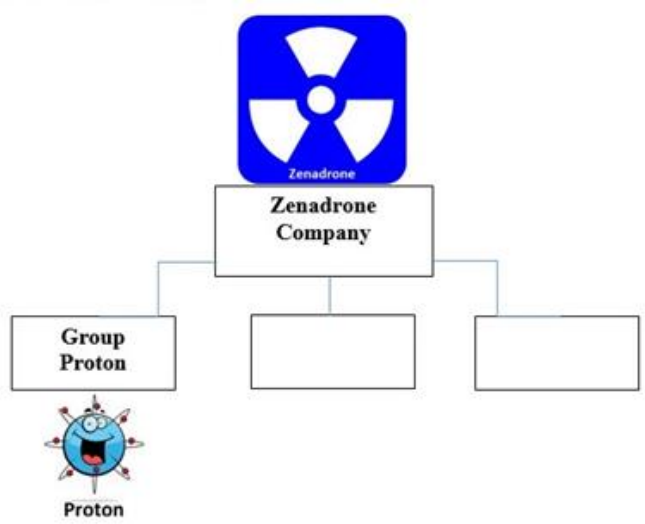
Dynamatic hired you several years ago as part of its associate trainee program, and has since promoted you to the rank of senior associate. Dynamatic's CEO, Abbie Smith, interviewed you personally and visited you at your home prior to you joining the company, promising you and your family that Dynamatic would be a continued success in both financial terms and in being an example to others of how a business can be socially responsible and profitable. This vision has proven successful, as Dynamatic's revenue and profitability have increased steadily since you joined the company. The organizational structure of Dynamatic is shown below:

Abbreviated organizational chart shown with group narratives

Weaker sub-group identification-Stronger superordinate group identification condition



Stronger sub-group identification-Weaker superordinate group identification condition



Decision point at which participants chose whether to cooperate or not

You have completed the decoding of your initial allocation of letter strings. You may use the time you have remaining in the period (which has been temporarily paused) in either of the following ways:

1. Work on additional letter-number decoding that earns compensation for you and for the members of another group of your choosing. This work will be completed anonymously. That is, the other group will not know that they have received this benefit until the entire experiment ends, and will never know that you are the one who provided this benefit. Similarly, any benefit your group receives from a member of another group during the experiment will remain anonymous as well.

If you select this option, you will be re-directed to a screen on which you will choose the group you wish to benefit with this work, after which you will be taken to a separate screen to complete the decoding task. **Recall that if choosing this option, you will receive $0.05 for each string you correctly decode, and each member of the group you choose to benefit will receive $0.05 (x 3 group members).**

2. Work on additional letter-number decoding that earns compensation for you only. **Recall that if choosing this option, you will receive $0.10 for each string you correctly decode.**

If you select this option, you will be re-directed to a separate screen to complete the decoding task.

Please make your choice and click "Next" to proceed.

- ○ **Option #1 - work on decoding that earns compensation for you and the members of another group**
- ○ **Option #2 - work on decoding that earns compensation for you only**

Next

If choosing to cooperate, participants then selected the target group for their cooperative work

Recall that there are three **groups** in **your company**. Please choose the group you wish to benefit with the work you complete in the time remaining in the period, and then click "Next" to continue.

- ○ **Other Group #1**
- ○ **Other Group #2**

Next

APPENDIX B

I. Presented below are the PEQ items used to measure identification, adapted from prior literature (e.g., Ashforth & Mael, 1989; Haslam 2001). Items were counter-balanced between participants, such that half of the participants responded to the sub-group items first, while the other half responded to the superordinate group items first. All items are scored from 1-5 on a scale of "Strongly Disagree" to "Strongly Agree," with items #2 and #3 in both lists being reverse-scored. Confirmatory factor analysis supports the use of a single factor for each construct, with one factor returning an eigenvalue > 1, and factor loadings and proportions of variance explained for each factor above generally accepted cutoffs (Kline 2011).

Sub-group:

1. During each work period, I often thought of the **group**.
2. I did not feel any sense of attachment to the **group**.
3. If given the opportunity, I would have liked to join a different **group**.
4. I believe other members of the **group** are probably a lot like me.
5. It is likely that my **group** was better than other groups at the decoding task.

Superordinate group:

1. During each work period, I often thought of the **company**.
2. I did not feel any sense of attachment to the **company**.
3. If given the opportunity, I would have liked to join a different **company**.
4. I believe the members of **other groups** within the **company** are probably a lot like me.
5. This **company** would be viewed in a positive manner by the average individual.

II. Presented below are the PEQ items used to measure the constructs of *Concern for the Larger Collective* and *Perception of Intergroup Competition*. Confirmatory factor analysis supports the use of a single factor for each construct, with one factor returning an eigenvalue > 1, and factor loadings and proportions of variance explained for each factor above generally accepted cutoffs (Kline 2011).

Concern for the Larger Collective:

1. I chose to work for the benefit of another group because the total payoff (to all individuals combined) was higher for that work than working for myself alone.
2. I chose to work for the benefit of another group because that group was part of my company.
   Both items – Range (1-5): Strongly Disagree – Strongly Agree

Perception of Intergroup Competition:

1. Generally speaking, how did you view the other two groups present in the study?
   Range (1-5): Much less positively than my own group – Much more positively than my own group
2. I chose to work for the benefit of another group because I did not feel that my group was in competition with others. (Note: This item is reverse-scored).
   Range (1-5): Strongly Disagree – Strongly Agree

REFERENCES

Antle, R., & Eppen, G. D. 1985. Capital rationing and organizational slack in capital budgeting. *Management Science*, 31, 163-174.

Ashforth, B. E., Harrison, S. H., & Corley, K. G. 2008. Identification in organizations: An examination of four fundamental questions. *Journal of Management*, 34(3), 325-374.

Ashforth, B. E., & Johnson, S. A. 2001. Which hat to wear? The relative salience of multiple identities in organizational contexts. In *Social Identity Processes in Organizational Contexts*, eds. M. A. Hogg and D. J. Terry, 31–48. Hove UK: Psychology Press.

Ashforth, B. E., & Mael, F. A. 1989. Social identity theory and the organization. *Academy of Management Review*, 14, 20-39.

Balliet, D., Wu, J., & De Dreu, C. K. 2014. Ingroup favoritism in cooperation: A meta-analysis. *Psychological Bulletin*, 140(6), 1556-1581.

Bamber, E. M., & Iyer, V.M. 2002. Big 5 auditors' professional and organizational identification: Consistency or conflict? *Auditing: A Journal of Practice & Theory*, 21(2), 21-38.

Bamber, E. M., & Iyer, V.M. 2007. Auditors' identification with their clients and its effect on auditors' objectivity. *Auditing: A Journal of Practice & Theory*, 26(2), 1-24.

Bauer, T. 2015. The effects of client identity strength and professional identity salience on auditor judgments. *The Accounting Review*, 90(1), 95-114.

Bauer, T., & Estep, C. 2018. One team or two teams? Investigating relationship quality between auditors and IT specialists: Implications for audit team identity and the audit process. *Contemporary Accounting Research* (in press).

Brewer, M. B. 1991. The social self: On being the same and different at the same time. *Personality and Social Psychology Bulletin*, 17, 475-482.

Brewer, M. B., & Kramer, R. M. 1986. Choice behavior in social dilemmas: Effects of social identity, group size, and decision framing. *Journal of Personality and Social Psychology*, 50(3), 543–549.

Cain, D. M., Dana, J., & Newman, G. E. 2014. Giving versus giving in. *The Academy of Management Annals*, 8(1), 505-533.

Chaudhuri, A. 2011. Sustaining cooperation in laboratory public goods experiments: A selective survey of the literature. *Experimental Economics*, 14, 47-83.

Chen, C. X., Williamson, M. G., & Zhou, F. H. 2012. Reward system design and group creativity: An experimental investigation. *The Accounting Review*, 87(6), 1885-1911.

Chen, D. L., Schonger, M., & Wickens, C. 2016. oTree – An open-source platform for laboratory, online, and field experiments. *Journal of Behavioral and Experimental Finance*, 9, 88-97.

Chen, Y., Chi, S. S., & Friedman, R. 2013. Do more hats bring more benefits? Exploring the impact of dual organizational identification on work-related attitudes and performance. *Journal of Occupational and Organizational Psychology*, 86, 417-434.

Chow, C.W. 1983. The effects of job standard tightness and compensation scheme on performance: an exploration of linkages. *The Accounting Review*, 58, 667-685.

Christ, M. & Vance, T. 2018. Cascading controls: The effects of managers' incentives on subordinate effort to help or hurt. *Accounting, Organizations and Society*, 65, 20-32.

Cooper, D. J., and Kagel, J. H. 2016. Other-regarding preferences: A selective survey of experimental results. In *Handbook of Experimental Economics* (Vol. 2), eds. J. H. Kagel and A. E. Roth, 1-76. Princeton, NJ: Princeton University Press.

Dana, J., Weber, R. A., & Kuang, J. X. 2007. Exploiting moral wiggle room: Experiments demonstrating an illusory preference for fairness. *Economic Theory*, 33, 67-80.

Derlega, V. J., & Grzelak, J. 2013. *Cooperation and Helping Behavior*. 2nd edition. New York, NY: Academic Press.

Dovidio, J. F., & Gaertner, S. L. 2010. Intergroup bias. In *Handbook of Social Psychology (5th ed., vol. 2)*, eds. S. T. Fiske, D. T. Gilbert, and G. Lindzey, 1084-1123. Hoboken, NJ: John Wiley & Sons.

Ellemers, N., & Rink, F. 2005. Identity in work groups: The beneficial and detrimental consequences of multiple identities and group norms for collaboration and group performance. *Advances in Group Processes*, 22, 1-41.

Estep, C. 2017. Auditor integration of IT specialist input on internal control issues: How a weaker team identity can be beneficial. Working Paper. Emory University.

Evans, J. H., Hannan, R. L., Krishnan, R., and Moser, D. V. 2001. Honesty in managerial reporting. *The Accounting Review*, 76(4), 537-559.

Farrell, A. M., Grenier, J. H., & Leiby, J. 2017. Scoundrels or stars? Theory and evidence on the quality of workers in online labor markets. *The Accounting Review*, 92(1), 93-114.

Glavas, A., & Kelley, K. 2014. The effects of perceived corporate social responsibility on employee attitudes. *Business Ethics Quarterly*, 24(2), 165-202.

Haisley, E. C., & Weber, R. A. 2010. Self-serving interpretations of ambiguity in other-regarding behavior. *Games and Economic Behavior*, 68, 614-625.

Haslam, S. A. 2001. *Psychology in Organizations: The Social Identity Approach*. London: Sage.

Hogg, M. A. 2007. Uncertainty-identity theory. *Advances in Experimental Social Psychology*, 39, 69-125.

Hogg, M. A., & Terry, D. J. 2000. Social identity and self-categorization processes in organizational contexts. *Academy of Management Review*, 25, 121-140.

Horngren, C. T., Datar, S. M., & Rajan, M. 2014. *Cost Accounting: A Managerial Emphasis*. 15th edition. Hoboken, NJ: Pearson.

Hornsey, M. J. 2008. Social identity theory and self-categorization theory: A historical review. *Social and Personality Psychology Compass*, 2/1, 204-222.

Hornsey, M. J., & Hogg, M. A. 2000a. Assimilation and diversity: An interactive model of subgroup relations. *Personality and Social Psychology Review*, 4, 143-156.

Hornsey, M. J., & Hogg, M. A. 2000b. Subgroup relations: A comparison of the mutual intergroup differentiation and common in-group identity models of prejudice reduction. *Personality and Social Psychology Bulletin*, 26, 242–256.

Indjejikian, R., & Matějka, M. 2012. Accounting decentralization and performance evaluation of business unit managers. *The Accounting Review*, 87(1), 261-290.

Karau, S. J., & Williams, K. D. 1993. Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology*, 65(4), 681-706.

Kelly, K. 2010. The effects of incentives on information exchange and decision quality in groups. *Behavioral Research in Accounting*, 22(1), 42-65.

Kelly, K., & Presslee, A. 2017. Tournament group identity and performance: The moderating effect of winner proportion. *Accounting, Organizations and Society*, 56, 21-34.

Kerr, N. L., & Tindale, R. S. 2004. Group performance and decision making. *Annual Review of Psychology*, 55, 623-655.

Kline, R. 2011. *Principles and Practice of Structural Equation Modeling*. 3rd edition. New York, NY: Guilford Press.

Luft, J., & M. D. Shields. 2009. Psychology models of management accounting. *Foundations and Trends in Accounting*, 4, 199-345.

Oakes, P. J. 1987. The salience of social categories. In *Rediscovering the Social Group: A Self-Categorization Theory*, eds. J. C. Turner, M. A. Hogg, P. J. Oakes, S. D. Reicher, and M. S. Wetherell, 117–41. Oxford, UK: Blackwell.

Oakes, P. J., & Turner, J. C. 1990. Is limited information processing the cause of social stereotyping? *European Review of Social Psychology*, 1, 111-135.

Paolocci, G., Chandler, J., & Ipeirotis, P. G. 2010. Running experiments on Amazon Mechanical Turk. *Judgment and Decision Making*, 5(5), 411-419.

Reis, H. T., & Judd, C. M. (Eds). 2014. *Handbook of research methods in social and personality psychology*. New York, NY: Cambridge University Press

Riketta, M. 2005. Organizational identification: A meta-analysis. *Journal of Vocational Behavior*, 66, 358-384.

Riketta, M., & van Dick, R. 2005. Foci of attachment in organizations: A meta-analytic comparison of the strength and correlates of workgroup versus organizational identification and commitment. *Journal of Vocational Behavior*, 67, 490-510.

Rowe, C. 2004. The effect of accounting report structure and team structure on performance in cross-functional teams. *The Accounting Review*, 79(4), 1153-1180.

Stefaniak, C. M., Houston, R. W., and Cornell, R. M. 2012. The effects of employer and client identification on internal and external auditors' evaluations of internal control deficiencies. *Auditing: A Journal of Practice & Theory*, 31(1), 39-56.

Tajfel, H., & Turner, J. C. 1979. An integrative theory of intergroup conflict. In *The Social Psychology of Intergroup Relations*, eds. W. G. Austin, and S. Worchel, 33-47. Monterey, CA: Brooks/Cole.

Tauer, J. M., & Harackiewicz, J. M. 2004. The effects of cooperation and competition on intrinsic motivation and performance. *Journal of Personality and Social Psychology*, 86(6), 849-861.

Towry, K. L. 2003. Control in a teamwork environment – The impact of social ties on the effectiveness of mutual monitoring contracts. *The Accounting Review*, 78(4), 1069-1095.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. 1987. *Rediscovering The Social Group: A Self-Categorization Theory*. Oxford, England: Blackwell.

van Dick, R., van Knippenberg, D., Kerschreiter, R., Hertel, G., & Wieseke, J. 2008. Interactive effects of work group and organizational identification on job satisfaction and extra-role behavior. *Journal of Vocational Behavior*, 72, 388-399.

van Knippenberg, D. 2000. Work motivation and performance: A social identity perspective. *Applied Psychology: An International Review*, 49, 357-371.

Waller, W. S., & Chow, C. W. 1985. The self-selection and effort effects of standard-based employment contracts: a framework and some empirical evidence. *The Accounting Review*, 60, 458-476.

Walton, G. M., Cohen, G. L., Cwir, D., & Spencer, S. J. 2012. Mere belonging: The power of social connections. *Journal of Personality and Social Psychology*, 102(3), 513-532.

Wildschut, T., Pinter, B., Vevea, J. L., Insko, C. A., & Schopler, J. 2003. Beyond the group mind: A quantitative review of the interindividual–intergroup discontinuity effect. *Psychological Bulletin*, 129(5), 698-722.

Wit, A. P., & Kerr, N. L. 2002. "Me versus just us versus us all" – Categorization and cooperation in nested social dilemmas. *Journal of Personality and Social Psychology*, 83(3), 616-637.

Wit, A. P., & Wilke, H. A. 1992. The effect of social categorization on cooperation in three types of social dilemmas. *Journal of Economic Psychology*, 13, 135-151.

Wyer, R. S., Adaval, R., & Colcombe, S. J. 2002. Narrative-based representations of social knowledge: Their construction and use in comprehension, memory, and judgment. *Advances in Experimental Social Psychology*, 34, 131-197.

Yzerbyt, V., & Demoulin, S. 2010. Intergroup relations. In *Handbook of Social Psychology (5th ed.,vol. 2)*, eds. S. T. Fiske, D. T. Gilbert, and G. Lindzey (Eds.), 1024-83. Hoboken, NJ: John Wiley & Sons.

Zimmerman, J. L. 2017. *Accounting for Decision Making and Control*. 9th edition. New York, NY: McGraw-Hill.

TABLE 1

Manipulation Checks & Post-Experiment Questionnaire Identification Items

Condition	n	Sub-Group Identification[1]	Superordinate Group Identification[2]
Stronger Sub-Group Identification	102	3.13 (0.64)	
Weaker Sub-Group Identification	102	2.70 (0.69)	
Stronger Superordinate Group Identification	102		3.06 (0.69)
Weaker Superordinate Group Identification	102		2.55 (0.69)
All	204	2.91 (0.70)	2.81 (0.73)

Notes:
[1] Mean (sd). An average of five PEQ questions related to the participant's identification with their assigned *group*.
[2] Mean (sd). An average of five PEQ questions related to the participant's identification with their assigned *company*.

TABLE 2

Cooperation and Task Performance

Condition	n	% of compensated rounds choosing cooperation	Task Performance (Strings per minute)
Stronger Sub-Group Identification	408	33%	5.37
Weaker Sub-Group Identification	408	15%	5.66
Stronger Superordinate Group Identification	408	27%	5.38
Weaker Superordinate Group Identification	408	21%	5.64
All	816	24%	5.51

TABLE 3

$$Cooperation = \alpha + \beta_1 StrongSuperID + \beta_2 StrongSubID + \beta_3 StrongSuperID \times StrongSuperID + Gender + TaskDiff + InitialWork + \varepsilon$$

	(1)	(2)	(3)
Intercept	0.60 (0.41)	0.27* (0.20)	0.23** (0.18)
StrongSuperID	1.44* (0.40)		1.29 (0.55)
StrongSubID		2.74*** (0.81)	2.48** (1.08)
StrongSubID×StrongSuperID			1.21 (0.70)
Gender	1.60** (0.45)	1.74** (0.51)	1.75** (0.51)
TaskDiff	1.11 (0.14)	1.08 (0.14)	1.09 (0.14)
InitialWork	0.79*** (0.07)	0.83** (0.08)	0.82** (0.07)
n	816 (204 participants)	816 (204 participants)	816 (204 participants)
Wald Chi-square (prob > chi2)	11.32 (0.02)	18.61 (0.02)	22.21 (0.00)

Notes:
Odds ratio (standard error) displayed for model results. *, **, *** indicate significance at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors are clustered by participant.

TABLE 4

$$Task\ Performance = \alpha + \beta_1 Coop + \beta_2 StrongSubID + \beta_3 StrongSuperID + \beta_4 StrongSubID \times StrongSuperID + Gender + TaskDiff + CoopSynergy + GroupBenefit + \varepsilon$$

	(1)	(2)	(3)
Intercept	6.25*** (0.20)	6.03** (0.61)	4.07*** (0.93)
Coop	-0.72*** (0.29)	0.10 (0.26)	0.01 (0.26)
StrongSubID	-0.25 (0.17)	-0.06 (0.19)	-0.17 (0.19)
StrongSuperID	-0.26 (0.16)	-0.19 (0.16)	-0.11 (0.16)
SubID×SuperID	0.08 (0.12)	0.02 (0.12)	0.05 (0.12)
Gender	-0.02 (0.26)	0.03 (0.25)	-0.03 (0.25)
TaskDiff	-0.22* (0.13)	-0.23** (0.12)	-0.24** (0.12)
CoopSynergy		-0.71*** (0.20)	-1.91*** (0.53)
GroupBenefit			0.83*** (0.34)
n	816 (204 participants)	816 (204 participants)	816 (204 participants)
F (prob > F)	5.59 (0.00)	6.79 (0.00)	5.96 (0.00)

Notes:
Odds ratio (standard error) displayed for model results. *, **, *** indicate significance at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors are clustered by participant.

FIGURE 1
Theoretical model for the predicted effects of multi-level group identification on intergroup cooperation and performance

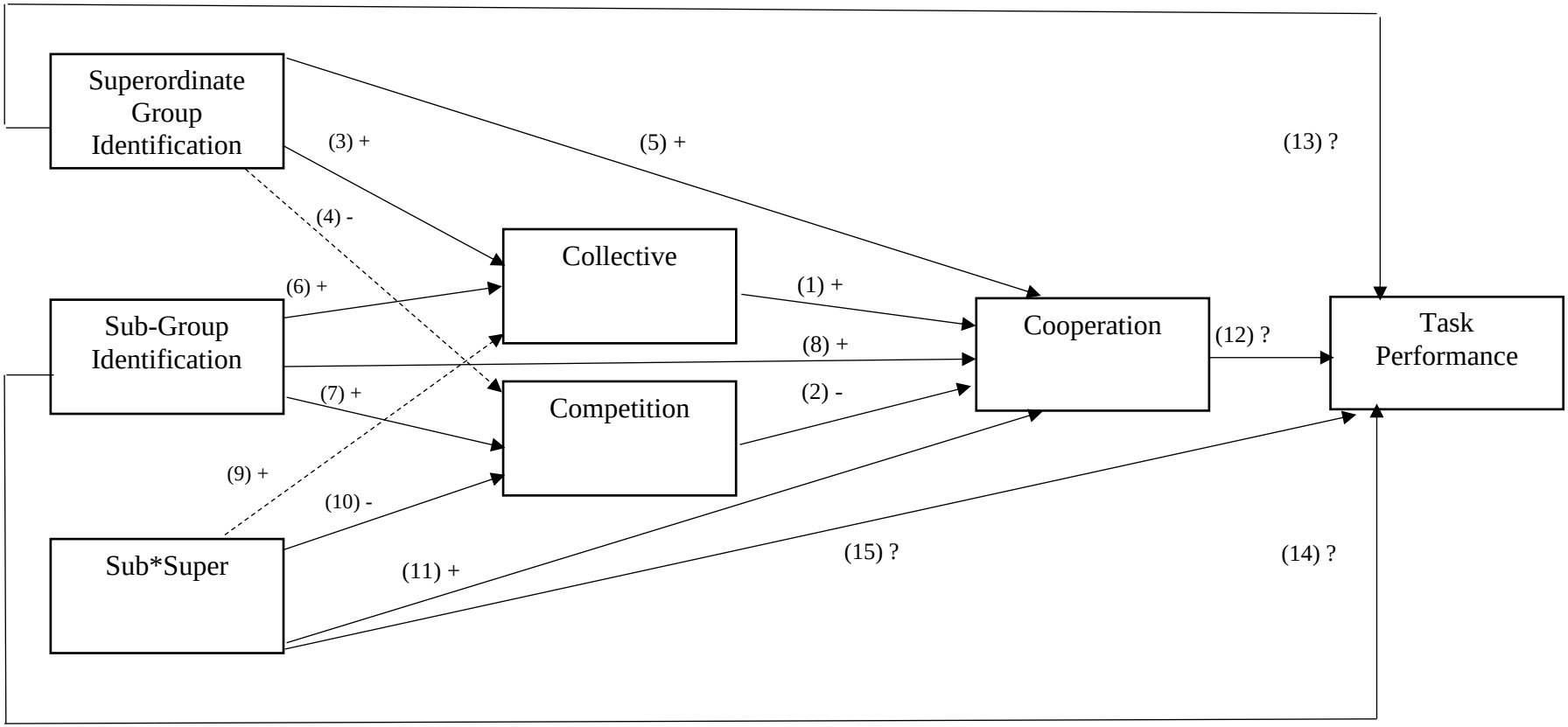
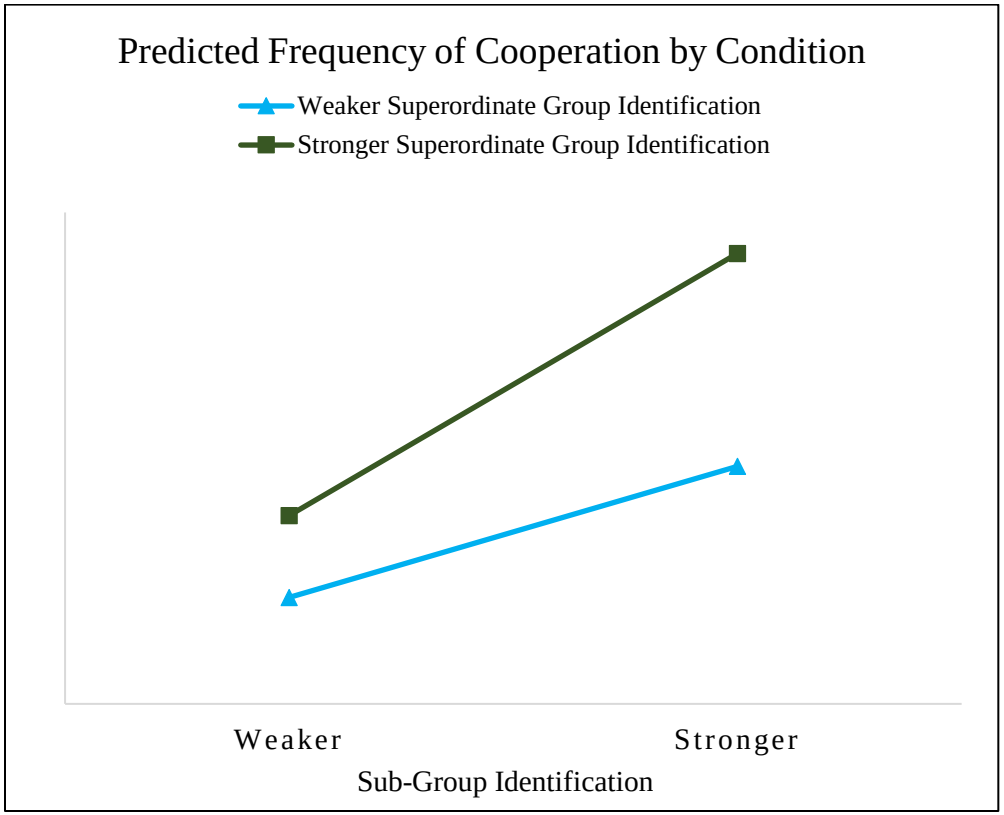
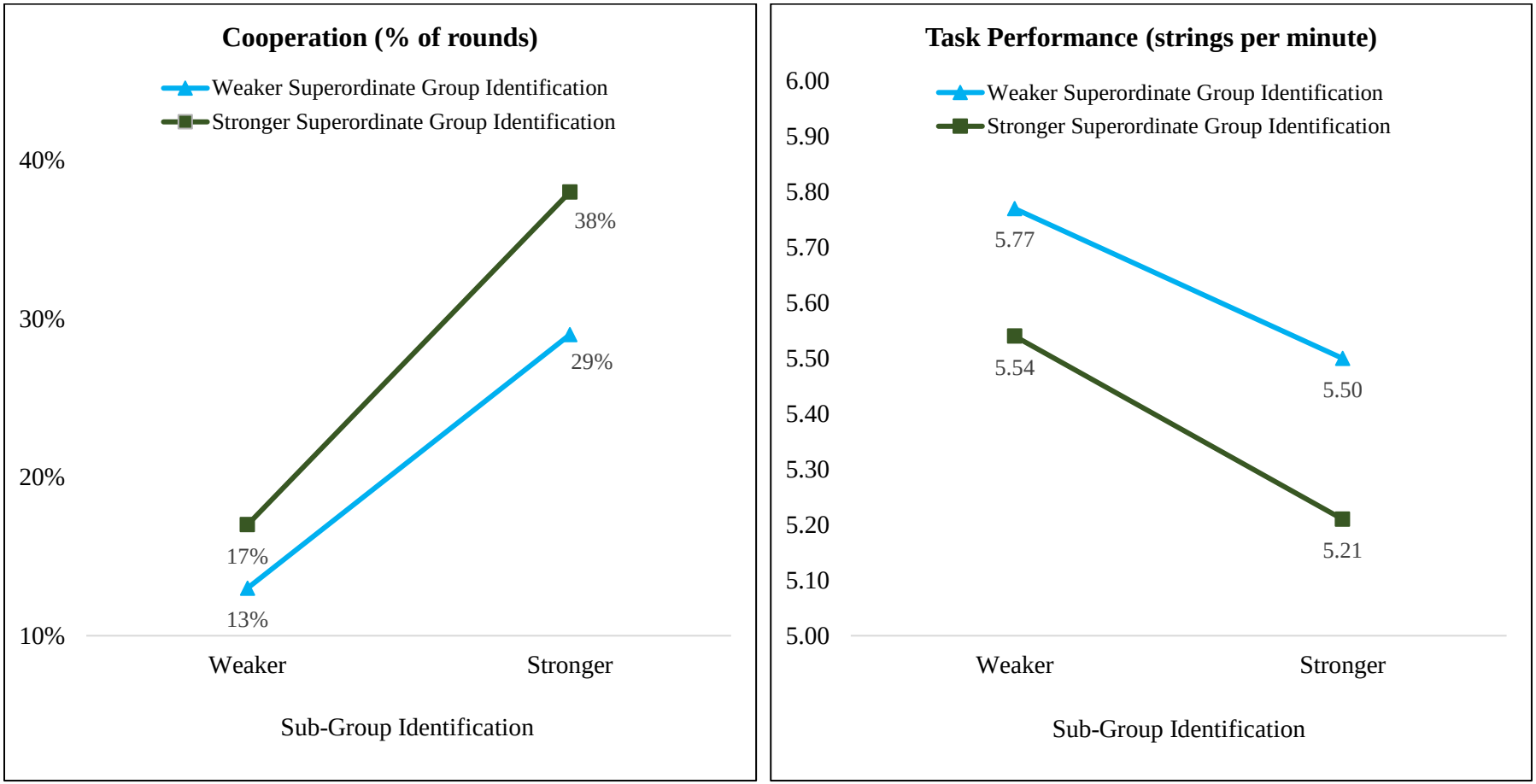


FIGURE 2



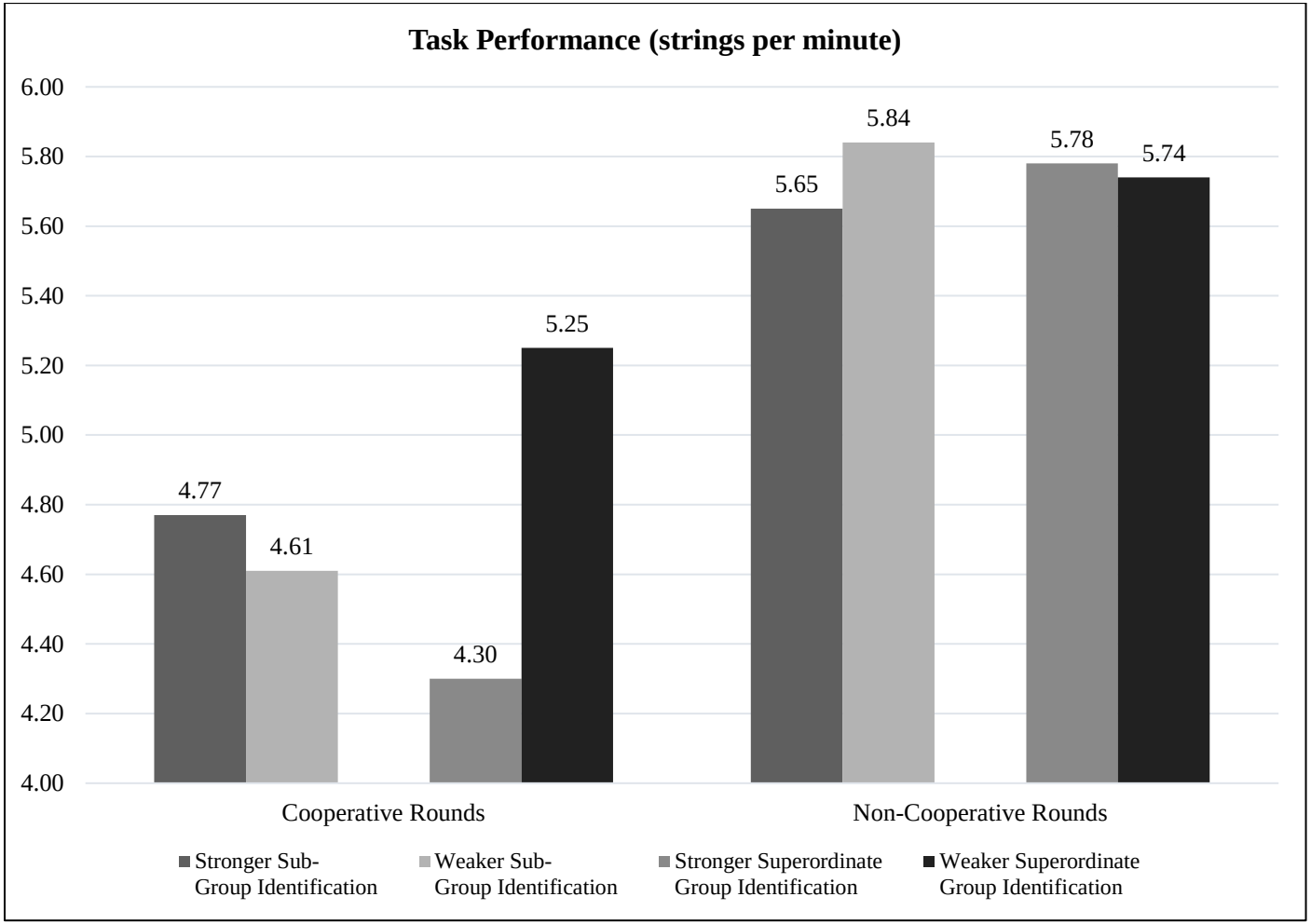
Notes:
Figure 2 plots the predicted frequency of intergroup cooperation as a function of sub-group identification and superordinate group identification.

FIGURE 3



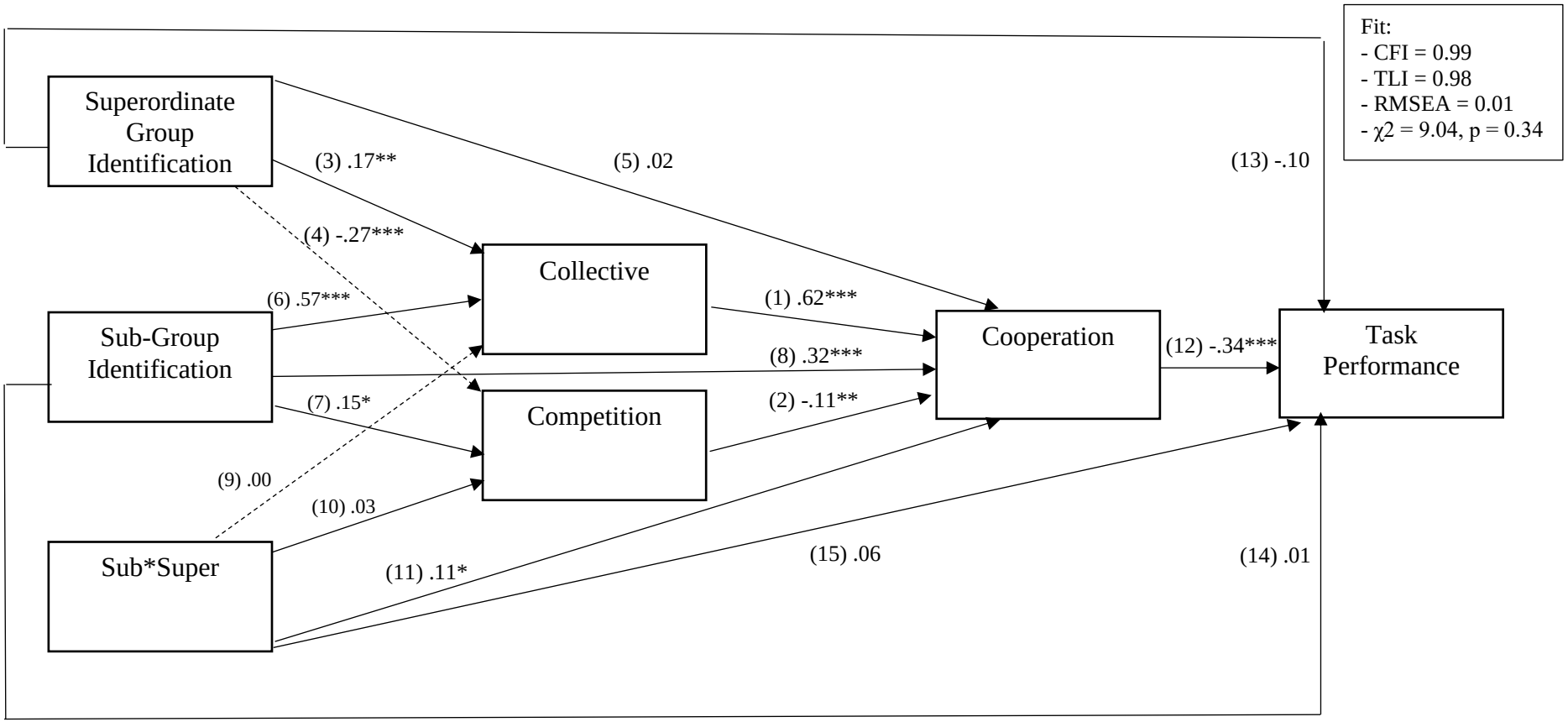
Notes:
Figure 3 plots the portion of compensated rounds in which participants chose personally costly cooperation (working for the benefit of themselves and another group within their company), as well as overall task performance (as measured by the number of strings correctly decoded per minute), as a function of experimental condition.

FIGURE 4



Notes:
Figure 4 illustrates overall task performance (as measured by the number of strings correctly decoded per minute), by type of round (cooperative vs. non-cooperative) and condition.

FIGURE 5
GSEM of the Effects of Multi-Level Group Identification on Intergroup Cooperation & Performance



All reported coefficients are standardized. *, **, *** represent significance at p < 0.10, p < 0.05, and p < 0.01, respectively (one-tailed tests for directional predictions). Standard errors are clustered by participant. Some paths use dashed arrows for sake of readability.

1. Superordinate Group Identification – Factor score estimated using the five PEQ questions related to participants' identification with their assigned company.

2. Sub-Group Identification – Factor score estimated using the five PEQ questions related to participants' identification with their assigned group.

3. *Sub*Super* – Interaction between Sub- and Superordinate Group Identification, constructed using the cross-product of the factor scores (Jöreskog 1998).

4. *Collective* (*Concern for the Larger Collective)* – Factor score estimated using three PEQ questions pertaining to participants' motivation to cooperate and benefit other sub-groups.

5. *Competition* (*Perception of Intergroup Competition)* – Factor score estimated using two PEQ questions pertaining to participants' perception of the intergroup competitiveness of the setting (i.e. competition with other sub-groups).

6. *Cooperation* – Binary indicator = 1 if participant chose to work for the benefit of themselves and another sub-group, 0 otherwise.

7. *Task Performance* – Participants' efficiency (number of correctly decoded strings per minute) in work completed after making the decision to cooperate.