The Effect of Perceived Role Suitability on Prestige, Dominance, Performance, and Communication.

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A thesis submitted in partial fulfillment of the requirements for the Master of Science degree in Psychology

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Abstract

The pursuit of social rank is pervasive across societies and cultures. Previous studies have identified two distinct avenues for attaining social rank: prestige and dominance. While prestige (communication of skill/ability) and dominance (communication of superiority) are crucial to interpersonal interactions, it is unclear how people communicate prestige or dominance and how such communication affects team performance. To investigate these ideas, 206 individuals participated in a cooperative dyadic building task. A computer randomly assigned dyad members to one of two roles—builder (who handled and placed model pieces) and instructor (who directed the builder's actions). Additionally, using a false feedback paradigm, a computer informed some participants they would perform better in either the builder or instructor role, regardless of their actual assigned role, to see whether perceived role aptitude affected prestige/dominance cues. Thus, the design included two factors: role (builder/instructor) and feedback type (matched with role, mismatched with role). During the task, participants worked together to construct a LEGO model, which was then scored for completion/correctness. Building sessions were video recorded for offline analysis. Data analysis showed the manipulated role feedback did not change partner-ratings of dominance or prestige, suggesting these interpersonal styles may function similarly to stable personality traits and are not dependent on perceived ability or role aptitude. Moreover, we found no evidence that partner-rated dominance or prestige communication affected how much of the model the group completed. However, the results show dominance had an effect on the number of mistakes made in the model in that mistakes were fewest when one partner was high in dominance and the other was low. Discussion focuses on how these variables relate to performance ability and interpersonal processes.

Keywords

Communication, Social Cues, Performance, Dominance and Prestige, Role Suitability, Narcissism, Task-Efficacy
Lay Abstract

The desire to gain more social status and power exists among all social groups. Two common ways individuals try to increase their influence within groups is through communicating prestige (communication of skill/ability) and dominance (communication of superiority). It is not clear how exactly these types of communications are successfully transmitted. Furthermore, it is unclear how engaging in such strategic communications such as dominance or prestige affect group performance. To investigate these ideas, 206 individuals were organized in pairs and worked together to build a LEGO mode. A computer randomly assigned each partner one of two roles—builder (who handled and placed model pieces) and instructor (who directed the builder's actions). Additionally, a computer informed one of the partner members they would perform better in either the builder or instructor role, regardless of their actual assigned role. This feedback was not accurate, but randomly assigned by the computer. This process results in two factors: role (builder/instructor) and feedback type (matched with role, mismatched with role). During the task, participants worked together to construct a LEGO model, which was then scored for completion/correctness. Building sessions were video recorded for analysis. Data analysis showed the manipulated role feedback did not change partner-ratings of dominance or prestige, suggesting these communication styles may function similarly to stable personality traits and are not dependent on perceived ability or role aptitude. Moreover, we found no evidence that partner-rated dominance or prestige communication affected how much of the LEGO model the group completed. However, the results show dominance had an effect on the number of mistakes made in the model in that mistakes were fewest when one partner was high in dominance and the other was low. Discussion focuses on how these variables relate to performance ability and interpersonal processes.
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Chapter 1

1 Introduction and Literature Review

Hierarchies are social systems in which there is “an implicit or explicit rank order of individuals or groups with respect to a valued social dimension” (Magee & Galinsky, 2008, p. 354; Van Berkel, Crandall, Eidelman, & Blanchard, 2015). In social hierarchies, members cultivate and maintain group values through a system of rewards and punishments. Individuals who demonstrate prosocial behavior and adhere to group norms are rewarded with social inclusion and hierarchy advancement. Conversely, group members who demonstrate antisocial behavior or violate societal norms are often punished using criticism and ostracization (Magee & Galinsky, 2008). High status individuals enjoy increased power as well as psychological and material benefits (Anderson, Hildreth, & Howland, 2015). As such, status can be a valuable asset which people are willing to make sacrifices to obtain or maintain (Huberman, Loch, & ÖNçüler, 2004).

Social hierarchies are ubiquitous across human societies (Anderson & Willer, 2014), are a fundamental feature of social relations (Magee & Galinsky, 2008), and can rapidly develop in novel groups (Koski, Xie, & Olson, 2015). As such, researchers have argued that desire for status is a fundamental human motivation (Anderson, Hildreth, & Howland, 2015). One likely reason social hierarchies are so prevalent is due to the benefits hierarchies provide in interpersonal interactions. For example, social hierarchies may be necessary for promotion of collaborative work (Pratto, Sidanius, Stallworth, & Malle, 1994) because they give structure to interpersonal interactions, help dictate social protocols, and improve group processes (Halevy, Chou, & Galinsky, 2011). Such societal structure provides a sense of stability, meaning, and perceived control (Friesen, Kay, Eibach, & Galinsky, 2014). Indeed, when societal threats emerge, individuals tend to seek out hierarchy-supporting social structures for stability (Friesen, Kay, Eibach, & Galinsky, 2014). Specifically, hierarchical protocols might allow smoother social interactions, make social interactions more predictable, and enhance team performance (Bendersky & Hays, 2012; Carzo & Yanouzas, 1969).
However, whereas hierarchies may provide social scaffolding that improves group performance, they also have aspects detrimental to group performance (Greer, de Jong, Schouten, & Dannals, 2018). Some research has found that steeper social hierarchies have a diminishing effect on team learning (Edmondson, 2003; Bunderson, 2003) and performance (Tost, Gino, & Larrick, 2013). One of the ways hierarchies can hurt performance is through the intragroup status conflicts necessary for the development and maintenance of hierarchies (Bendersky & Hays, 2012). Such conflicts might cause group members to jockey for status and power rather than focus efforts on group tasks.

While it is clear that internal status conflicts can affect group processes, it is not well understood how exactly status conflicts influence cooperative team performance or what determines when people decide whether to participate in status conflicts. This is partially due to the complexity and variety in the protocols for status attainment between social groups. That is, individuals frequently belong to more than one group and must navigate several concurrent hierarchies, each with differing status markers and protocols to obtain rank. For example, a woman’s programming ability might aid her in rising in the ranks of her computer science student cohort, but they are unlikely to aid her in navigating her acting troupe’s hierarchy. Because of the variety in hierarchies and protocols, it is difficult to determine what influences willingness to engage in status conflicts, how people effectively communicate status, and how this affects performance.

However, recent research has shown successful status seekers often utilize two distinct overarching strategies to attain social rank—dominance and prestige (Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013). Dominance strategies use force, intimidation, and coercion to induce fear and submission whereas prestige strategies use competence displays to increase the group’s collective consensus on the individual’s social worth. Understanding that competition for social rank can be pursued in two distinct manners raises an interesting question: what influences an individual’s decision to communicate dominance or prestige in rank competitions?

*Internal Factors Influencing Dominance.* Dominance has a rich literature in biology and in almost every psychological field (Cheng, Tracy, & Henrich, 2010).
Traditionally, researchers claimed most non-human groups determine social rank through dominance hierarchies where group members compete for position through physical hostility and antagonistic encounters (Chase, Tovey, Spangler-Martin, & Manfredonia, 2002; Sapolsky, 2005). Humans also utilize physical dominance displays, and physical size is one of the strongest predictors of perceiving someone as dominant (Witkower, Tracy, Cheng, & Henrich, 2019). However, human dominance is not limited to physical threats. It can also take the form of social threats such as public humiliation, social exclusion, limitation of resources, or public disclosure of undesirable information to the group. While much research has examined dominance, it is still debated what influences an individual’s decision to engage in dominance-based status conflicts.

Much recent psychological research has examined dominance through the lens of Social Dominance Theory (SDT) and Social Dominance Orientation (SDO), which focus on an individual’s preference for their in-group to be dominant over other groups (Pratto, Sidanius, Stallworth, & Malle, 1994). In the SDO framework, a preference for dominance is conceptualized as originating from innate personality. Furthermore, correlational evidence for a personality basis for dominance is that self-rated dominance correlates with all five major personality dimensions except openness to new experiences (DeYoung, Quilty, & Peterson, 2007; Cheng, Tracy, & Henrich, 2010) and has been shown to be associated with traits such as narcissism, aggression, and disagreeableness (Cheng, Tracy, & Henrich, 2010).

Hormones also influence dominance and status-desiring displays. Several studies have found that testosterone interacts with cortisol to produce a variety of status-relevant behaviors, including dominance, competitive behavior, aggression, risk-taking, economic decision-making, and social status (Mehta & Prasad, 2015; Hamilton, Carré, Mehta, Olmstead, & Whitaker, 2015). Similarly, estradiol has been implicated as a hormone that increases the motivation for power in women (Stanton & Edelstein, 2009; Stanton & Schultheiss, 2007). Gender also seems to influence dominance displays. Dominance ratings differ between genders, and some studies have shown dominance and dominant social cues differ depending on the gender composition of the group (Aries, Gold, & Weigel, 1983)
Internal Factors Influencing Prestige. Prestige has received less attention than dominance in the scholarly literature, but scholars have examined for decades the connection between competency and status (Berger, Cohen, & Zelditch, 1972). While dominance displays often take the form of threats and intimidation, prestige cannot be communicated through coercive means (Anderson & Kilduff, 2009). Rather, prestige strategies rely on an individual’s ability to portray skills or resources valued by the group.

We know little about what influences individuals to engage in prestige-based status conflicts. Some evidence suggests that there is a biological or developmental basis for utilizing prestige strategies. Self-reported use of prestige strategies correlates with the five major personality dimensions (Cheng, Tracy, & Henrich, 2010) and has been associated with traits such as genuine self-esteem, agreeableness, conscientiousness, advice-giving, and prosociality (Cheng, Tracy, & Henrich, 2010). This suggests prestige strategies may derive from fundamental personality attributes.

Thus, dominance and prestige both correlate with personality. However, whereas evidence suggests hormones influence dominance, it is uncertain whether hormones influence prestige. Some preliminary evidence associates prestige with certain hormones. For example, one study demonstrated that when men achieved high standing in a group’s prestige hierarchy, their testosterone levels subsequently increased over the study period (Cheng, Kornienko, & Granger, 2018), whereas there were minimal changes in testosterone for women or men low in prestige. Another study found that men who were rated high in self-rated prestige had lower level so basal testosterone (Johnson, Burk, & Kirkpatrick, 2007). Another hormone that might relate to prestige is oxytocin. While there is no evidence oxytocin causes people to choose prestige strategies, oxytocin is linked to behaviors associated with prestigious strategies such as trust (Kosfeld, Heinrichs, Zak, Fischbacher, & Fehr, 2005) and generosity (Zak, Stanton, & Ahmadi, 2007).

Context-specific Factors Influencing Dominance and Prestige. In addition to personality and hormones, context-specific factors also affect the use of dominance and prestige in status conflicts. Above all, individuals first must be motivated to obtain or
maintain social rank within the group. When individuals encounter potential status conflicts, their decision to engage is likely influenced by factors such as the likelihood of success, outcomes, opponents’ status, presence of supportive group members, and confidence in their own abilities (Ergeneli, Camgoz, & Karapinar, 2010; Loucks-Atkinson & Mannell, 2007). Many of these factors relate to an individual’s satisfaction with their current social rank and their perceptions of self-esteem, self-efficacy, group dynamics, and group/role suitability.

Self-efficacy is a theoretically strong predictor of willingness to engage in status conflicts. Across a wide variety of tasks, people are more likely to do what they believe they can do (Bandura, 1997). Therefore, if people desire status and believe they are well equipped to pursue it, they are likely to engage in status conflicts. In accord, there is some evidence to support the idea that an individual’s self-confidence and self-efficacy are associated with status-striving behavior (Overbeck, Correll, & Park, 2005; Sandelands, Brockner, & Glynn, 1988; Atwater, Dionne, Avolio, Camobreco, & Lau, 1999; Sidanius & Pratto, 1993; Loucks-Atkinson & Mannell, 2007).

However, self-efficacy is context dependent (Bandura, 1997). Thus, the environment of the social hierarchy might impact self-efficacy within the group and therefore affect an individual’s willingness to engage in status conflicts. For example, a competent high school chess player might have high self-efficacy among peers and choose to engage in status conflicts to increase social rank, but low self-efficacy among professional chess players and be reticent to engage in status conflicts to avoid losing social rank.

The context-dependent nature of self-efficacy might influence what strategies an individual use to achieve social rank. For example, if a large employee is competing for a promotion against a smaller, more experienced employee, they might choose to use physical intimidation or fear because they believe they are not equally competent and prestige strategies would be ineffective. Therefore, one’s self-efficacy in a given task and satisfaction with the role they occupy within the group might influence what strategies they employ in status conflicts. Interestingly, self-esteem, which is highly correlated with
general self-efficacy (Judge & Bono, 2001), positively relates to prestige, but negatively to dominance (Cheng, Tracy, & Henrich, 2010). This suggests that while self-efficacy might be associated with an increase in status striving, it does not have a consistent effect on all status-seeking strategies.

*Dominance, Prestige, and Narcissism.* Similar to self-efficacy, narcissism also has a nuanced, context-dependent relationship with status conflict, dominance, and prestige. Narcissism is typified by persistent beliefs of grandiosity (American Psychiatric Association, 2013). People who experience high levels of narcissism typically report high self-esteem and self-efficacy (Brookes, 2015), but some evidence suggests that narcissistic self-esteem functions differently than ‘genuine’ self-esteem (Tracy, Cheng, Robins, & Trzesniewski, 2009). While genuine self-esteem was associated with successful social interactions, narcissistic self-esteem was associated with increased aggression and antisocial behaviors. This difference in narcissistic self-esteem could impact the decision to employ dominance versus prestige strategies in status conflicts. For example, one study found that genuine self-esteem was related to increased partner-rated prestige, while narcissistic self-esteem related to increased partner-rated dominance (Cheng, Tracy, & Henrich, 2010). Thus, individuals high in narcissism might favor dominance strategies over prestige strategies to advance social rank.

Research has also found that individuals’ high in narcissism react poorly to being assigned a subordinate role within groups (Benson, Jordan, & Christie, 2016). This suggests individuals high in narcissism disproportionately care about group relative rank and role suitability, which could lead to an increased desire to improve social rank and engage in social conflicts.

Finally, narcissism has been associated with several behaviors detrimental to group performance such as counterproductive work behaviors (Ying & Cohen, 2018; Glad, 2002) and deficits in information sharing (Nevicka, De Hoogh, Van Vianen, Beersma, & McIlwain, 2011). Narcissism has also been associated with poor ratings of performance over time (Ong, Roberts, Arthur, Woodman, & Akehurst, 2016), with the caveat that few studies have examined its effect on objective measures of performance in
controlled settings. Thus, the relationships between narcissism and factors such as role suitability, self-esteem, social rank, and dominance and prestige displays, and objective cooperative group performance remain an open question.

1.1 Present Study

The present study will examine how the context-specific factors of role suitability and aptitude within a group predict successful communication of dominance and prestige, and subsequently predict performance. We also present exploratory findings pertaining to what social cues might be effective in communicating dominance and prestige.

We decided to use the most basic and fundamental type of groups as our experimental unit—dyads. Research has shown that when individuals are not alone, they are more frequently in dyads rather than larger groups (Moreland, 2010). Further, in many occupational capacities, dyadic relationships are commonly formed between supervisors and subordinates to coordinate efforts and provide feedback on performance and expectations (Hoption, 2016; Tsui, Porter, & Egan, 2002). Due to the simplicity, prevalence, and importance of dyads, we examine our research hypotheses through dyadic relationships.

To examine objective dyad performance, both partners participated in a cooperative dyadic building task wherein communication between partners was necessary for success and each member of the dyad was assigned a distinct role. Performance was scored as a dyad and measured by completion and how many mistakes the dyad made.

To examine how role suitability might affect partner-rated prestige and dominance, and how this might influence dyadic performance in cooperative group tasks, we designed our study around a manipulation geared to alter feelings of role suitability and aptitude for one participant in the dyad (i.e., the target). We organized the dyads into target and naïve partners in order to use the naïve partner as a type of foil to the target partner—if our experimental manipulation has an effect on the behaviors or beliefs of the naïve partner, it would be a sign that our manipulation given to the target changed the behaviors of the target partner.
Dominance, Prestige, and Performance Predicted by Task Self-efficacy and Role Suitability. Our first hypothesis is that individuals who believe their abilities align with their assigned group role (role-congruence) will have more confidence in their abilities to win status competitions, which will result in communicating more prestige to their dyad partners. Conversely, individuals who do not believe their abilities align with their assigned role (role-incongruence) will have less confidence in their abilities, and will communicate less prestige and dominance to their partners.

In our second hypothesis, we propose communication of dominance and prestige will have differing effects on objective dyadic performance. We believe dominance displays, which are antagonistic and egocentric, will increase mistakes on the task, whereas prestige displays, which focus on demonstrating competence, will be associated with increased task performance. As such, we believe that partner-ratings of dominance will negatively correlate with group performance, while partner-rated prestige will positively relate to performance.

Narcissism’s Relationship to Dominance, Prestige, and Performance. Narcissism is likely to influence several of our key variables and we believe it may also have effects of its own. We hypothesize participants high in narcissism will prefer to be in a leadership role and will be less engaged and more antagonistic if assigned a subordinate role, which will negatively affect performance. We also hypothesize that individuals high in narcissism will be more willing to seek status and thus communicate more dominance and prestige as previous research has found that dominance was positively associated with narcissistic admiration and rivalry, whereas prestige was only positively related to narcissistic admiration (Zeigler-Hill, et al., 2019).

Social Cues in Status Communication. In addition to our main hypotheses, we will conduct a preliminary examination of social cues exchanges in dyadic conversations associated with dominance and prestige. We hypothesize that certain social cues will emerge as being associated with dominance and prestige, thereby suggesting future research directions. As previous research has suggested smiling is associated with
increased ratings of prestige (Witkower, Tracy, Cheng, & Henrich, 2019), we similarly predict smiling will be predictive of partner-rated prestige.

Table 1. Hypotheses

1. Individuals in dyads who feel their abilities are well suited to their assigned role will communicate more prestige, and consequently influence group performance.
2. Dominance will be negatively correlated with performance and prestige will be positively correlated with dyadic performance.
3. Individuals high in narcissism will dislike being in a subordinate role, which will negatively affect performance. Furthermore, narcissism will be associated with more dominance and prestige.
4. Dominance and prestige will be associated with distinct patterns of social cues in dyadic groups; specifically smiling will be associated with increased partner-rated prestige.
Chapter 2

2 Study Design and Methodology

To test our hypotheses, we designed a cooperative building task in which pairs of participants worked together to build a LEGO model of the Arc de Triomphe. The task required teamwork and communication because only one dyad member had access to the build instructions while the other was the only member with access to the LEGO bricks. Both participants were video recorded for offline analysis of verbal and non-verbal exchanges.

2.1 Participants

Two hundred six participants aged 17 to 35 completed the task in dyads (56 female-female, 12 male-male, and 35 mixed-gender dyads). Of these participants, 168 were undergraduate psychology students who completed the task in exchange for partial course credit. We recruited the remaining 38 participants via advertisements on campus and compensated them $15 for the 90-minute study session. These participants were slightly older than the participants who completed the task for partial course credit ($M = 22.97, SD = 4.57; t(36.678)=5.337; p < .001$. All but four (88.9%) of the paid participants reported they were current students or recent (January or June 2019) Western University graduates. Because none of the demographic variables correlated with task measures, these groups have been collapsed to enhance statistical power. Table 1 contains demographic information. An additional 12 participants (6 Dyads) also completed the study but their dyads were excluded because technical difficulties interfered with data collection.

Participants received information about the nature of the study and gave consent before completing any measures. The Western University Non-medical Ethical Review Board approved all study procedures (see Appendix A).
Table 2. Demographic Variables

<table>
<thead>
<tr>
<th>Group</th>
<th>Women</th>
<th>Men</th>
<th>t (df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>147</td>
<td>59</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Age</td>
<td>19.42 (3.06)</td>
<td>19.75 (2.55)</td>
<td>-.720 (204)</td>
<td>.473</td>
</tr>
<tr>
<td>LEGO Experience</td>
<td>2.59 (1.54)</td>
<td>3.86 (1.78)</td>
<td>-5.121 (204)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>LEGO Use (past year)</td>
<td>1.44 (.88)</td>
<td>1.75 (1.26)</td>
<td>-1.771 (82.843)*</td>
<td>.080</td>
</tr>
<tr>
<td>Autism Spectrum Quotient (AQ)</td>
<td>19.31 (5.02)</td>
<td>20.22 (5.56)</td>
<td>-1.136 (204)</td>
<td>.257</td>
</tr>
<tr>
<td>Narcissism</td>
<td>46.67 (12.43)</td>
<td>52.95 (13.62)</td>
<td>-3.190 (204)</td>
<td>.002</td>
</tr>
</tbody>
</table>

*Note: *Degrees of freedom adjusted for violations of homogeneity of variance assumption.

2.2 Procedure

Participants began the study session by completing a short set of questionnaires in separate rooms. These questionnaires assessed mood, leadership traits, and personality. The main purpose of these questionnaires was to enhance the believability of a subsequent false feedback manipulation. The computer then presented them with a description of the LEGO building task. In the LEGO task, participants worked together to build a LEGO model, which was scored based on how many pieces they correctly placed within 20 minutes. The computer then gave participants a description of the two task roles and the session procedure as follows:

In this task, there will be two roles—an “instructor” and a “builder.” The instructor will be the only participant who has access to the building instructions. The instructor’s job is to instruct the builder on how to assemble the LEGO model. The builder will be the only participant with access to the LEGO model and parts. The builder’s job is to assemble the LEGO model in accordance with the instructor’s instructions. The instructor will not be able to see the builder’s progress except in designated “strategy breaks,” which we will give you further instructions on later in the study.
After reading the task description, participants reported their perceptions of how they would perform if assigned to each role.

One participant, randomly selected by the computer in a double-blind fashion, and then received the following feedback: *Previous participants who scored similarly to you on these questionnaires typically performed best when assigned to the [builder / instructor] role in the coming task.* However, this feedback was randomly assigned and not based on any of the participants’ questionnaire scores. The computer also randomly assigned participants to task roles regardless of their results or feedback they received. To ensure that participants understood their role assignment was random, the computer provided the following text: *You have been randomly assigned the role of [builder / instructor].* Finally, manipulated participants reported on the degree to which they thought their own performance would correspond with the feedback. This design led to each dyad having one partner who received feedback (target participant) and one partner who received no feedback (naïve partner). The manipulated feedback for half contained congruent feedback (i.e., their dyad would perform best if they were assigned to their current role), whereas the other half received incongruent feedback (i.e., their dyad would perform best if they had been assigned their partner’s role).

The experimenter then escorted participants into the task room and seated them on opposite sides of a large table with a mid-torso height partition installed between them (45cm above seat height). The instructor’s station comprised a computer that displayed the LEGO instructions so only the instructor could see them (see Appendix H). The builder’s station contained a shallow container holding all the separated LEGO pieces needed for the Figure 1. Session set-up. The Builder (left) and Instructor (right) interact over a shoulder-height barrier to construct a LEGO model of the Arc de Triomphe.
model. Importantly, the barrier prevented the instructor from being able to see the LEGO model, but was short enough to allow for easy communication between participants. Both participants received a printed task aid (see Appendix G) with the basic rules for each of their roles, a glossary of LEGO terms, and a list of the common colors in the model. Cameras placed behind each station captured participants’ verbal and nonverbal behavior (see Figure 1).

Before the building task began, the experimenter read participants a set of detailed instructions about the build (see Appendix E) and answered their questions. Once the task began, the experimenter left the room and the instructor’s computer controlled the time of the build and breaks. Dyads had 20-minutes to complete “as much of the build as possible.” In addition, there were three, 3-minute ‘strategy breaks’ evenly spaced within the 20-minute build period. These breaks did not count towards the 20-minute build duration. During the strategy breaks, the instructions were not available to the instructor, but the builder could raise the model above the barrier so the instructor could view it and provide comments.

After completing the build, participants returned to their original rooms to complete another set of questionnaires in which they described their experience of the task and partner.

While the participants completed the final questionnaires, the experimenter scored the LEGO model, and recorded the following qualities: (a) the number of LEGO pieces correctly connected and (b) the number of types of mistakes made (e.g., they mistakenly used grey pieces instead of black pieces in a step, they mistook the orientation of some LEGO pieces in a step). Examples of finished models appear in Figure 2b. After participants completed their final questionnaires, they completed a funnel debriefing.
procedure in which they were probed for suspicion, fully debriefed, and allowed to provide fully informed consent for the task.

2.3 Questionnaires

A full list of the text of all measures appears in Appendix D. For brevity, we focus here on only the measures intended for analysis in the present project (therefore excluding most of the pre-task measures).

*Role Aptitude.* Immediately after participants read the building task protocol, they responded to a question assessing how well they believed they would perform if assigned to each of the roles on a 5-point Likert scale (1 = Poor, 5 = Excellent). Across both roles, participants rated themselves as having moderate aptitude ($M = 3.08, SD = 1.01$), with no significant difference in perceived aptitude between role ($M_{\text{Builder}} = 2.93, SD = 0.94$; $M_{\text{Instructor}} = 2.97, SD = 1.04$; $t(208.85) = 0.95, p = .34$).

After the task, participants responded on a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree) to an item indicating whether they believed switching roles would have allowed the group to complete more of the model ($M = 3.77, SD = 1.63$). They also reported on whether they thought they would have done a better job at their partner’s role than their partner did, $M = 3.54, SD = 1.64$.

These questions allowed us to examine participants’ beliefs about the degree to which they were suited to their roles or role aptitude. We are interested in how role aptitude relates to performance, perceived performance, and dominance and prestige communication.

*Manipulation Check.* To assess whether the target (manipulated) participants believed the false feedback, they responded to an item indicating how accurate they believed their feedback was on a 7-point bipolar scale (anchored by “Not at all” and “Extremely”).

*Perspectives on the Task.* Participants responded to four questions regarding how they felt about the task on a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree).
Participants reported how fun and engaging the task was, how frustrating the task was, how comfortable they felt in the task, and how smooth the interactions felt. We are primarily interested in how role assignments related perspectives about task.

**Perceived Performance.** To assess participants’ perceptions about their performance, participants reported a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree) whether they agree that they and their partner performed well in their respective roles. Participants also reported what percent of teams they believed they outperformed (visual analogue scale; 0-100). Builders and instructors tended to believe their dyad performed slightly worse other dyads ($M_{Builders} = 45.65$, $SD = 20.17$; $M_{Instructor} = 46.75$, $SD = 22.11$).

**Task Leadership.** We measured task leadership in a variety of ways. First, we measured general self-perceived leadership ability (i.e., “Generally, I am a good leader.”), as well general partner-perceived leadership ability (i.e., “Generally, I think my partner is a good leader.”). Second, we asked each participant, “who led the task,” on a bipolar visual analogue scale anchored by 0 (“I led the task”), to 100 (“My Partner led the task”). Participants had a strong tendency to rate the instructor as the leader in the task. Instructors reported that they led the task more than their partner did ($M_{Instructor} = 35.01$), builders reported that they led the task less than their partner did ($M_{Builder} = 54.72$). This indicates that both partners viewed the instructor as the predominant leader. However, a paired t-test revealed that the degree participants believed the instructor led the task was higher for instructors than for builders, $M_{Builder} = 54.73$ ($SD = 15.29$), $M_{Instructor} = 64.99$ ($SD = 17.62$); $t(102) = 4.91$, $p < .001$. We are interested in this leadership metric to examine which role was viewed as the leadership role and whether this influenced the behavior of individuals high in narcissism.

**LEGO Experience.** To control for potential differences in LEGO experience, participants responded to the question, “How much experience do you have with LEGO or similar building products?” on a Likert scale from 1 (None) to 7 (Extensive).
Participants also reported how frequently they used LEGO or similar building products in the past year on a 7-point Likert scale from 1 (Never) to 7 (Every day).

Social Ability. We measured self-reported social ability to ensure that dyads were similar and to test whether it predicted task performance given the heavy communication focus required in the task. To do so, we used the Autism-Spectrum Quotient (AQ) (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001). The AQ is a 50-item scale on which participants respond to questions assessing social ability and comfort with social interactions (e.g., “I find it easy to “read between the lines” when someone is talking to me”; “I enjoy social chitchat.”). Participants rate their agreement with each item on a 4-point scale (“Definitely Agree,” “Slightly Agree,” “Slightly Disagree,” and “Definitely Agree”). In our sample, the AQ total score demonstrated acceptable internal consistency (α = .66).

Narcissism. To measure narcissism, we used the Narcissistic Admiration and Rivalry Questionnaire (NARQ) (Back, et al., 2013) as the NARQ demonstrates good unidimensionality and measurement precision (Grosz, et al., 2017). It consists of 18 items measured on a six point Likert scale from 1 (Do not agree at all) to 6 (Agree completely). The NARQ measures two factors of narcissism—Admiration and Rivalry. The admiration factor assesses the degree to which respondents seek grandiosity by self-promotion (e.g., “I manage to be the center of attention with my outstanding contributions”). The Rivalry subscale measures how respondents seek grandiosity by avoiding social failures through antagonistic self-defense (e.g., “I often get annoyed when I am criticized”). In the present sample, our internal consistency coefficients were high (α_Total: .86; α_Admiration: .81; α_Rivalry: .82) and comparable to other samples (Back, et al., 2013). We used this measure to examine how narcissism influences perceived role aptitude, how participants received the manipulated feedback, how participants react to subordinate role assignments, and how these factors might influence performance.

Dominance and Prestige. To measure how participants perceive their partners’ dominance and prestige communication and whether this influences outcomes, we used the peer-report dominance and prestige scales (Cheng, Tracy, & Henrich, 2010). We
administered the dominance and prestige scales after the building task. In these scales, participants rated their partner on dominance (e.g., “My partner was willing to use aggressive tactics to get his/her way”) and prestige (e.g., “I would seek my partner’s advice on a variety of matters”) on a seven-point Likert scale from 1 (not at all) to 7 (very much). We added the dominance and prestige scales to the survey shortly after the data collection began. As such, the first 14 dyads did not complete these measures. In the present sample, our internal consistency coefficients were acceptable ($\alpha_{\text{Dominance}}: .60$; $\alpha_{\text{Prestige}}: .77$), but somewhat lower than those other samples ($\alpha_{\text{Dominance}}: .88$; $\alpha_{\text{Prestige}}: .85$) (Cheng, Tracy, & Henrich, 2010).

To investigate why dominance had such low internal consistency, we examined the internal consistency of the dominance scale and found two questions were not strongly associated with the others: “My partner does NOT have a forceful or dominant personality,” and “My partner did NOT enjoy the authority associated with his/her role.” Based on differences in the nature of our task versus the task in the original validation sample, we believe that our participants were unable to rate these items because of the way people communicate in the two types of tasks. After removing these variables, the dominance factor had much better internal consistency ($\alpha = .73$).

### 2.4 Communication and Social Cues

An open question in the literature focuses on the types of verbal and nonverbal behaviors people use when they perceive dominance and prestige within a partner’s communications. One major dominance cue is bodily expansion whereas head angle seems to be a prestige cue (Witkower, Tracy, Cheng, & Henrich, 2019). However, in our task participants sat behind a partition that only allowed them to view the partner’s face and the task setup minimized space for movement, meaning that we were unable to get a reliable measure of postural expansion. Similarly, the fact that participants frequently looked down at the model (builders) or computer (instructors) made this cue less reliable within the task parameters. We therefore did not attempt to code these variables.

To explore the social cues that might be associated with a partner’s perception of dominance and prestige, we relied on the view that prestige involves the demonstration of
expertise in a warm, caring, and prosocial manner, whereas dominance involves aggressive, apathetic, and antisocial communications (Witkower, Tracy, Cheng, & Henrich, 2019). We identified seven social cues we thought might relate to dominance and prestige (see Table 3) and tallied the frequency with which each member within a subset of dyads used each one.

**Table 3. Social Cues Examined.**

- Smiles
- Strategy Suggestions (e.g., “You should organize the LEGO by color and shape so you can find the pieces faster.”)
- Asking understanding questions (e.g., “Is this piece supposed to be going the same direction as the last piece?”)
- Hand representations designed to illustrate a verbal instruction
- Using social softeners (e.g., “I’m sorry; I explained that poorly.”)
- Contradictions (e.g., “Your instruction doesn’t make sense, that won’t work.”)
- Interruptions

To select which dyads to code in this exploratory analysis, we identified the 15 participants with the highest and lowest partner-rated dominance and prestige ratings. Although this ranking identified 60 scores, several dyads included partners ranked high/low on both variables and there were several dyads in which both partners ranked individually. For example, in Dyad 68, the instructor ranked the 13th highest in prestige and 15th highest in dominance, while the builder ranked 6th highest in dominance. In this instance, although we only analyzed one dyad, three of the scores we wished to analyze were in the Dyad. Due to this selection process, we ended up identifying 37 dyads. We examined behavior of both partners in these dyads.

In each dyad, we coded 8 minutes of interaction. The time selected for analyses started immediately after the second strategy break, to the end of the third strategy break, therefore including one build period and one free communication period. Three of the selected dyads spontaneously chose to speak Mandarin Chinese during the session. A native Mandarin Chinese speaking coder coded those sessions. One dyad, in which the participants conversed in Guajarati, was excluded from the analysis due to a lack of translator availability. Because of this of this, our final included 36 dyads. It is common, when coding behavioral data, to ask multiple coders to code a number of sessions to assess agreement. Thus far, however, we note that too few sessions have received this treatment to make interrater agreement statistics meaningful. Analyses of these data must,
therefore, be treated as exploratory. Continuing the coding of these behavioral data is ongoing and is a future direction for this research.
Chapter 3

3 Results

Our central research question was whether telling participants that they were well-matched (role-congruent feedback) versus poorly-matched (role-incongruent feedback) to the role to which they had been assigned would change partner-perceived prestige communication patterns and consequently, task performance. We were particularly interested in how narcissism affected this relationship and the social cues associated with dominance and prestige.

We examined this question in a series of steps. First, we analyzed the direct effect the manipulated feedback and role assignment had on objective performance metrics and examined potential covariates. In our second step, we analyzed if the manipulated feedback and role assignment had an effect on dominance and prestige communication, and then tested if dominance and prestige were related to performance. Finally, we concluded with examining the social cues associated with dominance and prestige.

3.1 Performance

We predicted that dyads would communicate more prestige when the manipulated feedback matched target-participants’ role assignments (role-congruent feedback), and influence performance metrics. To measure performance, we examined both objective measures of performance (correctly connected pieces (Correct Pieces); types of mistakes (Mistakes)) as well as subjective measure of performance (target participants’ estimates of group performance (Perceived Performance)).

Because the emphasis in our study is on how the manipulated feedback affects group performance, we only included target participants in this analysis (target and naïve participants receive the same score for objective performance). We conducted three 2x2 ANOVAs including the factors Role (builder, instructor) and Feedback Congruence (i.e., if the target was told they would perform best in the role they were assigned (congruent feedback), or the role their partner was assigned (incongruent feedback)) to predict three performance variables: Correct Pieces, Mistakes, and Perceived Performance.
The groups within the 2x2 conditions were not completely balanced for a few reasons. Firstly, our random condition assignment worked in a way that the conditions may differ in size by up to three dyads but be balanced at 150 dyads. Further, because of technical errors or request to not use data, we excluded a few dyads from the analysis. Due to this, the builder-incongruent had three more dyad (28) than the other conditions (25 each).

There was a marginal effect of role on Correct Pieces, such that manipulated instructors tended to be in groups with more Correct Pieces than manipulated builders (exact statistics appear in Table 4; Figure 3A). This was likely due to a marginally significant interaction between role and feedback congruence, suggesting that instructors receiving role-congruent feedback seemed to outperform those receiving role incongruent feedback (see Figure 3A). There was no main effect of feedback congruence. Neither of the factors (i.e., role; feedback congruence) affected either number of mistakes during the build or targets’ perceived performance (see Table 4 for exact results). These analyses show that the manipulated feedback did not significantly affect either objective or subjective performance metrics.

Figure 3. Performance by Condition. The boxplot encompasses the second to third quartile of the data whereas the whiskers span +/- 1.5 the interquartile range. The Horizontal lines in boxplots report median scores and each point represent a dyad’s score on the performance measure.
Manipulation Check. One possibility for why our manipulated feedback did not have a statistically significant effect on performance measures may have been that participants did not believe the feedback. We tested this using a manipulation check. Notably, a technical error caused 11 participants not to receive the manipulation check. These participants have therefore been excluded from this analysis.

To test how accurate or believable participants thought the feedback was, we conducted a one-sample t-test (test value 4 “neutral”) using our manipulation check to determine whether participants believed the feedback. Results showed mild agreement with the feedback, \( t(90) = 5.384; p < .001 \) (\( M = 4.65, SD = 1.15 \)). There was no correlation between participants’ agreement with the feedback and any performance metric (Correct Pieces: \( r(91) = .005, p = .962 \); Mistakes: \( r(91) = .137, p = .194 \); Perceived Performance: \( r(91) = .049, p = .646 \)). These data suggest that the manipulated feedback was not particularly strong, as the feedback, though believable, was only mildly so and did not relate to performance.

<table>
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<th>Predictor</th>
<th>df</th>
<th>F</th>
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LEGO Experience. One might anticipate that experience with LEGO products relates to objective task performance. To test this potential covariate, we averaged dyad members’ LEGO experience and analyzed whether this average correlated with Correct Pieces or with Mistakes. Surprisingly, dyads’ average LEGO experience did not relate to objective performance measures (Correct Pieces: \( r(103) = .101 , p = .308 \); Mistakes: \( r(103) = .014, p = \)
This is likely because the nature of the task required significantly more communication than is typical of most LEGO projects.

**Social Ability.** Given the heavy communication focus required in the task, we tested whether social ability had an impact on performance using the AQ. Because the task roles likely require distinct communication skills, we tested this potential covariate’s effect on performance in both builder and instructors. Builders’ social ability showed no correlation with Correct Pieces, \( r(103) = -0.09, p = .388 \), or Mistakes, \( r(103) < .01, p = .999 \). Similarly, instructor social ability showed no significant correlation to with Correct Pieces, \( r(103) = -0.12, p = .222 \), or Mistakes \( r(103) = -0.05, p = .644 \). Therefore, we have no evidence to suggest that social ability, as measured by overall AQ, has any effect on objective performance in our task.

**Gender Composition Within Dyads.** The random assignment of participants to dyads left us with a set of female-female dyads \( (n = 56) \), mixed gender dyads \( (n = 35) \) and male-male dyads \( (n = 12) \). To ensure that idiosyncrasies in dyad assignment did not affect performance, we conducted a one-way ANOVA examining whether there were performance differences across dyads based on gender composition. Results showed that gender composition made no difference for either objective performance metric (Correct Pieces: \( F(2,100) = 1.08, p = .344 \); Mistakes: \( F(2,100) = 0.48, p = .619 \); see Figure 4). This may have been related to the fact that the method of splitting the task roles increased the requirement for good communication skills within the task, thereby reducing the male benefit of significantly greater LEGO experience.
Perceived Role Aptitude. Another variable that might affect performance is perceived role aptitude, or the degree to which participants think they will be good at the role to which they have been assigned. We had proposed that performance might depend on the degree to which people feel as though their skills match their assigned role. Interestingly, participants’ perceived role aptitude before the building task was entirely uncorrelated with the objective performance measures (Correct Pieces: $r(103) = .086$, $p = .386$; Mistakes: $r(103) = .054$, $p = .591$). However, perceived role aptitude did correlate with the target’s Perceived Performance, $r(103) = .222$, $p = .024$.

When responding to a similar role aptitude question after the building task however, perceived role performance tended to relate to correctly placed pieces, $r(103) = .170$; $p = .086$, as well as perceived performance, $r(103) = .393$; $p < .001$. Together, these data suggest that perceived performance reflects both role aptitude rated prior to building, as well as participants’ actual experience during the task. However, people’s self-reported role aptitude does not predict actual performance on the task, even though people have some capacity to accurately report on their actual performance after the build.

3.1.1 Narcissism

We expected participant narcissism would be relevant to our hypothesis in three ways. First, we believed narcissism might influence pre-task role aptitudes because narcissism positively correlates with self-evaluations (Tracy, Cheng, Robins, & Trzesniewski, 2009). Thus, if
our original hypothesis that perceived role suitability influences objective performance were true, narcissism would likely also have an effect on perceived performance as well as objective performance. Second, we were interested in whether narcissism influenced the degree to which participants believed or reacted to the manipulated feedback. Third, as previous studies have found that individuals high in narcissism react poorly to subordinate role assignments (Benson, Jordan, & Christie, 2016) we were interested in whether builder narcissism and instructor narcissism differently predicted performance.

Narcissism and Performance. To determine whether narcissism had a direct effect on performance, we performed a pair of stepwise regression predicting Correct Pieces and Mistakes. In the first step, we included builder narcissism and instructor narcissism as predictors. In the second step we included and the interaction between builder and instructor narcissism (Table 5 shows exact results). However, we failed to find any significant association with Correct Pieces or Mistakes (see Table 5 and Figure 5). These findings do not support our hypothesis that narcissism affects objective group performance.

Table 5. Regression Results Using Correct Pieces and Mistakes as Criterion

<table>
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<tr>
<th>Variable</th>
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<th>t</th>
<th>p</th>
<th>ΔR²</th>
<th>F</th>
<th>df</th>
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<tr>
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<td>Mistakes</td>
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Narcissism and Perceived Aptitude. To examine whether narcissism influenced perceived role aptitude, we tested whether builder or instructor aptitudes correlated with individual narcissism levels. Our findings show that narcissistic rivalry positively correlated with builder aptitude, $r(206) = .17, p = .014$, but not instructor aptitude, $r(206) = .03, p = .687$ (see Figure 6A). However, narcissistic admiration seeking significantly correlated with both perceived builder, $r(206) = .18, p = .010$, and instructor aptitude, $r(206) = .16, p = .020$ (see Figure 6B). Therefore, greater levels of narcissism predicted greater perceived role aptitude but this seems to stem primarily from narcissistic admiration seeking.
To test whether narcissism was associated with the belief that a participant was best suited for the instructor role, we calculated the difference between each participant’s pre-task self-reported instructor and builder role aptitude (Instructor Aptitude – Builder Aptitude) and tested the correlation between the difference in aptitudes with narcissism. The belief that participants had the greatest aptitude for the instructor role did not significantly correlate with narcissistic admiration, \( r(206) < .01, p = .992 \). Interestingly, there was a non-significant trend showing individuals high in narcissistic rivalry felt best suited to the builder role, \( r(206) = -.11, p = .128 \) (see Figure 6C). From these findings, narcissism did not seem to have a strong effect on a participant’s belief that they would be better suited to a particular role.

One potential reason for these surprising findings is that participants may have perceived the builder role to be easier or more enjoyable than the leadership role. Indeed, instructors reported marginally more frustration in the task than did Builders (\( M_{\text{Builder}} = 4.01, SD = 1.74; M_{\text{Instructor}} = 4.45, SD = 1.87; t(101) = -1.82, p = .072 \)). It may also have been that perceived status and power of the instructor position was low, as neither role was explicitly designated as the leader and instructors and builders had similar influence on the dyad’s performance. These surprising results might warrant future investigation.
Narcissism and Subordinate Role Assignment. Next, we explored whether individuals high in narcissism were displeased when assigned the subordinate role (i.e., the builder) and whether this affected performance. Surprisingly, builder narcissism did not correlate with builders’ desire for role reversal, $r(103) = .08, p = .418$, nor did it correlate with builders believing they could have done their partner’s job better, $r(103) = .11, p = .266$. Moreover, we found no significant correlation between builder narcissism and task frustration, $r(103) = .11, p = .266$. Interestingly, although we did find that builder narcissism was associating with builders’ frustration with their partner, $r(103) = .22, p = .025$, narcissistic instructors displayed the same tendency, $r(103) = .23, p = .021$. Thus, narcissism seems to predict frustration with others upon whom one’s performance depends. From these results, we did not find any evidence to suggest narcissistic builders were displeased with the role assignments.

3.2 Dominance and Prestige

We predicted telling participants they were well-matched versus poorly-matched to their role would change their behavior due to perceived task and role aptitude and would subsequently alter their partners’ estimates of their prestige. We anticipated subsequent effects of these behaviors on performance. To test this hypothesis, we first examined some interesting associations that gender and partner liking had with dominance and prestige ratings. We then explored whether role efficacy and role assignment had an effect on dominance and prestige communication. We then tested whether the manipulated feedback affected targets’ dominance and prestige as rated by their partners. We finally test the relationship between dominance and prestige ratings and objective performance.

Associations between Partner Liking and Frustration with Dominance and Prestige. We were curious to know if an individual’s dominance and prestige ratings were related to how positively their partner viewed them. To test this, we examined how an individual’s dominance and prestige ratings correlated with the degree their partners reported they would enjoy spending more time with them, and how frustrated they were with them.
An individual’s dominance was not associated with their partner wanting to spend more time with them both for builders or instructors (builders: \( r(87) = .09, p = .390 \), instructors: \( r(87) = .16, p = .134 \)). Interestingly, although builder dominance was positively associated with their partner reporting being frustrated with them, instructor dominance was not associated with increased partner-reported frustration (builders: \( r(87) = .25, p = .021 \), instructors: \( r(87) = .06, p = .561 \)), suggesting dominance might be more off-putting when manifest in subordinate roles.

An individual’s prestige was strongly positively related to their partners desire to spend more time with them both for builders and instructors (builders: \( r(88) = .42, p < .001 \), instructors: \( r(88) = .55, p < .001 \)). Individual’s prestige ratings were also strongly negatively correlated with partners being frustrated with them (builders: \( r(88) = -.28, p = .007 \), instructors: \( r(88) = -.40, p < .001 \)).

**The influence of Gender on Prestige and Dominance.** We tested if gender had an effect on how partners rated, and were rated by others, in dominance and prestige. For this test, we dummy-coded gender (0 = female, 1 = male) and conducted a series of regressions. Our results show that a participant’s gender did not affect how they rated others in dominance, but males tended to rate their partners lower in prestige than did females (see Table 6 for exact results). Aside from gender affecting how participants rated each other, our results suggest gender affected how their partner rated them, however, this depended on role assignments. Although builder gender did not affect how they were rated in dominance or prestige, marginally significant evidence suggests male instructors were rated as more dominant and prestigious than female instructors (see Table 6 for exact results).

These finding suggest that when examining peer-reported dominance and prestige, it is important to consider how gender and gender composition might be influencing ratings. In the current study, we disproportionally have women and female-female dyads, which might have inflated prestige ratings compared to male raters.
Table 6. Dominance and Prestige Ratings by Gender. Regression results using gender to predict how participants rate others on dominance and prestige, and how gender predicts how their partners rated them. Gender was dummy-coded as 0 = Female and 1 = Male.

<table>
<thead>
<tr>
<th>Variable</th>
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<th>F</th>
<th>p</th>
<th>R²</th>
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<td>3.93†</td>
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Gender affecting how one is rated:

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</table>

Note: †indicated p < .1. *indicates p < .05.

Pre-task Role Aptitudes Predicting Dominance and Prestige. As a preliminary test of whether preconceived perceptions about task aptitude affected dominance and prestige communication, we tested whether there were significant relationships between pre-task builder and instructor aptitudes, and participants’ dominance and prestige, as rated by their partners. We used a set of stepwise regressions to predict ratings of (1) instructor dominance and (2) prestige and (3) builder dominance and (4) prestige. To test these models, we added both participants’ reported role aptitudes in step 1, and the interaction between the aptitudes in step 2.

Our first analysis, predicting instructor dominance, showed no statistically significant effects in either step one or two, suggesting the instructors’ pre-task aptitudes had little effect on an instructor’s dominance ratings (exact results appear in Table 7). When examining instructor prestige, the results were similarly non-significant, suggesting that contrary to expectations, pre-task aptitude measures did not alter instructors’ dominance or prestige. Results were similar when examining builder dominance ratings. However, builder prestige was found to be affected by both their builder and instructor pre-task aptitude and interact
with one another in such a way that builders were rated as more prestigious when they felt they were relatively equally suited to either role (see Table 7 for results).

Figure 7. The interaction between the Builder’s Aptitude for the Builder and Instructor Roles Predicting Builder Prestige

These results suggest that contrary to what we expected, pre-task beliefs about role efficacy have little to do with communicating dominance and prestige in a group setting. While we did find some evidence to suggest that role aptitude affected prestige ratings for builders, this relationship was not as we predicted. Rather than our proposed relationship of greater aptitude predicting greater prestige, builders who believed they were relatively equally capable of completing either task (regardless of if they thought they would do well or poorly in both tasks) were rated as more prestigious. This relationship only manifest in the builder, and only in prestige. We are uncertain why this would be case, but future research in role efficacy and prestige might clarify the relationship.
Table 7. Stepwise Regression Results Using Builder and Instructor Prestige and Dominance as Criterion

<table>
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<th>p</th>
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</table>

Note: †indicated p < .1. *indicates p < .05.
The Effect of Manipulation on Dominance and Prestige. We conducted two 2x2 ANOVAs predicting dominance and prestige using the Targets’ Role (builder, instructor), and Feedback Congruence (Congruent, Incongruent). Contrary to our hypothesis, there was no statistically significant evidence that the manipulated feedback affected partner-reported dominance or prestige (for exact results see Table 8; Figure 8). Thus, the manipulated feedback did not appear to change target participants’ behavior enough to shift a partner’s dominance or prestige ratings.

<table>
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<th>p</th>
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Figure 8. Target Prestige and Dominance by Role and Feedback Congruence. The boxplot encompasses the second to third quartile of the data whereas the whiskers span +/- 1.5 the interquartile range. The Horizontal lines in boxplots report median scores and each point represent a dyad’s score.
Dominance, Prestige, and Performance. We then examined whether peer-rated dominance and prestige ratings affected group performance. To test our hypotheses that partners’ peer-rated dominance and prestige shape task performance, we conducted a series of stepwise regressions to predict the objective performance metrics (Correct Pieces, Mistakes). In our first step, we tested the hypothesis that performance would be affected by instructor and builder prestige. In our second step, we added the interaction between builder and instructor prestige. However, we did not find any significant relationships for either Correct Pieces or Mistakes (exact results appear in Table 9). Using the same method to examine the effects of dominance, we found no evidence that dominance predicted Correct Pieces. However, we did find evidence that the interaction between builder and instructor dominance predicted mistakes (see Mistakes predicted by dominance in Table 9). As our previous results suggested that mistakes also related to which partner received feedback (regardless of whether the feedback was congruent or not) we added one additional step (step 3) to this regression model to include the role of the partner who received the manipulated feedback (Target’s Role). This step and all its variables were statistically significant (see full results in Table 9 and graphs in Figure 9).

Figure 9. Correct Pieces and Mistakes by Prestige and Dominance. Points and regression lines break down responses partner-rated dominance and prestige for builders (blue) and instructors (orange).
Table 9. *Step-wise Regression Results Using Correct Pieces and Mistakes as Criterion*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
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*Note:* †indicated $p < .1$. *indicates $p < .05$. ** indicates $p < .01$. 

The results indicate that both instructor and builder dominance are significant predictors of mistakes and interact with one another such that dyads made the fewest mistakes when instructors and builders were dissimilar in dominance ratings (see Figure 10). When considering the effect of dominance and mistakes, the role of the partner receiving the manipulated feedback is also important. Consistent with earlier findings, fewer mistakes were made in dyads where the instructor received the manipulated feedback.

The interaction between partner dominance levels is interesting as it might suggest that having a team member high in dominance can be beneficial to group-level performance errors. However, if both partners are high in dominance, errors tend to increase. This might be a consequence of an increase focus on status negotiation rather than the group task. Nonetheless, from these data, we found no evidence that our manipulated feedback influenced dominance ratings. Similarly, dominance did not affect the number of Correct Pieces groups built, or pre-task aptitudes. Whereas dominance did affect the number of Mistakes a dyad made in the model, dominance could be beneficial or detrimental to accuracy depending on whether the partners were similar in dominance communication styles, consistent with existing literature (Keltner, Capps, Kring, Young, & Heerey, 2001; Keltner, Young, Heerey, Oemig, & Monarch, 1998).

3.2.1 The Effect of Narcissism and Dominance and Prestige

One question we set out to examine is how an individual’s narcissism relates to peer-reported dominance and prestige communications. Previous studies have examined the relationship of narcissism on dominance and prestige, but most have used the self-rated dominance and prestige scale (Zeigler-Hill, et al., Narcissism and the pursuit of status,,
One weakness of these self-reports is they do not measure dominant or prestigious behavior as experienced by an interaction partner, but primarily focus on how participants think others perceived them (e.g., I am considered an expert on some matters by others). Indeed, previous studies have shown various narcissism measures to be positively associated with both self-reported dominance and prestige (Semenyna & Honey, 2015; Cheng, Tracy, & Henrich, 2010). Recent research has shown a positive relationship between dominance and both the NARQ dimensions of rivalry and admiration. Prestige, on the other hand, relates positively with admiration, but negatively with Rivalry (Zeigler-Hill, et al., Narcissism and the pursuit of status., 2019). However, as Narcissism is associated with grandiosity, inflated perceptions of self, and delusions of grandeur, a better measure of an individual’s prestige or dominance is probably the peer-reported scale.

We anticipated peer-reported results would correspond with self-reported results such that dominance would positively correlate with narcissistic admiration and rivalry, whereas prestige would positively correlate with admiration and negatively correlate with rivalry. However, our findings differed from our expectations in that the results depended on role assignment. As expected, builder dominance was positively associated with builder admiration and rivalry. However, we failed to find any statistical relationships between instructor dominance and instructor narcissism. Furthermore, narcissism did not appear to relate to partner-rated prestige for participants in either role (zero-order correlations are presented in Table 10 and graphs on Figure 11).

<table>
<thead>
<tr>
<th>Table 10. Intercorrelations and Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor</td>
</tr>
<tr>
<td>1. Admiration</td>
</tr>
<tr>
<td>2. Rivalry</td>
</tr>
<tr>
<td>3. Dominance</td>
</tr>
<tr>
<td>4. Prestige</td>
</tr>
<tr>
<td>Builder</td>
</tr>
<tr>
<td>1. Admiration</td>
</tr>
<tr>
<td>2. Rivalry</td>
</tr>
<tr>
<td>3. Dominance</td>
</tr>
<tr>
<td>4. Prestige</td>
</tr>
</tbody>
</table>

Note. All dominance correlation coefficients use an N of 88. All prestige correlation coefficients use an N of 89. †p < .1. **p < .01. ***p < .001.

These results have several implications. First, although individuals’ narcissism might alter both the degree to which others see them as dominant or prestigious, as well as how prestigious or dominantly they view themselves, it does not alter perceiver ratings in the same way. Furthermore, the relationship between dominance, prestige, and narcissism seemed to be connected to participant role in our task and therefore might be more context dependent than previously assumed.
Figure 11. Dominance and Prestige by Narcissism and Role. Points break down narcissism levels between the two factors of the NARQ: Admiration and Rivalry. Regression lines are reported for total narcissism/2 (black), rivalry (blue), and rivalry (orange).

3.3 Social Cues

As an extension of our hypotheses, we sought to explore whether particular verbal and non-verbal cues were associated with partner perceptions of dominance and prestige. Informed by previous research (Witkower, Tracy, Cheng, & Henrich, 2019), we had hypothesized that prestige communication would be positively associated with smiling, suggesting strategies, asking more questions, and using hand representations to illustrate a verbal instruction. We also hypothesized dominance communication would be positively associated contradictions and interruptions and negatively associated with asking questions. Interestingly, the only social behavior that showed a marginal correlation with partner ratings was smiling (see Table 11 for results). It was particularly surprising that smiling had no effect on prestige ratings, given findings from previous research. In fact, rather than smiling being associated with prestige and competency, dyads that smiled more reported lower dyad-
level perceived performance, \( r(35) = -.32, \ p = .057; \) and Table 11). These findings, however, may be inconclusive because of the small number of groups with coded behavioral data.

Table 11. Correlations Between Social Cues, Dominance, Prestige and Performance. The first two columns contain the mean and standard deviation for how many times this behavior was observed in the eight-minute section of task we analyzed.

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Mean</th>
<th>SD</th>
<th>Dominance</th>
<th>Prestige</th>
<th>Correct Pieces</th>
<th>Mistakes</th>
<th>Dyad-level Perceived Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smiling</td>
<td>11.28</td>
<td>8.56</td>
<td>-.17</td>
<td>-.03</td>
<td>-.08</td>
<td>-.20†</td>
<td>-.32†</td>
</tr>
<tr>
<td>Strategy Suggestions</td>
<td>2.29</td>
<td>1.79</td>
<td>.15</td>
<td>.09</td>
<td>.08</td>
<td>.02</td>
<td>0.1</td>
</tr>
<tr>
<td>Understanding Questions</td>
<td>10.10</td>
<td>7.43</td>
<td>-.00</td>
<td>-.07</td>
<td>-.02</td>
<td>-.10</td>
<td>.02</td>
</tr>
<tr>
<td>Using Hands to Represent LEGO</td>
<td>2.64</td>
<td>3.08</td>
<td>.06</td>
<td>.03</td>
<td>.05</td>
<td>.03</td>
<td>-.11</td>
</tr>
<tr>
<td>Social Softeners</td>
<td>1.10</td>
<td>1.43</td>
<td>-.02</td>
<td>.01</td>
<td>-.16</td>
<td>-.18</td>
<td>-.11</td>
</tr>
<tr>
<td>Contradictions</td>
<td>2.35</td>
<td>2.65</td>
<td>.16</td>
<td>-.05</td>
<td>.04</td>
<td>.14</td>
<td>.06</td>
</tr>
<tr>
<td>Interrupting</td>
<td>3.54</td>
<td>3.85</td>
<td>-.09</td>
<td>-.13</td>
<td>.01</td>
<td>-.04</td>
<td>.01</td>
</tr>
</tbody>
</table>

*Note.† p < .1*
4 Discussion

Summary of Hypotheses. The primary aim of the current research was to examine whether the context-specific factor of role aptitude within a group predicts communication of dominance and prestige, and subsequently predicts performance. We tested this by presenting information designed to manipulate pre-task beliefs about how suitable a participant’s abilities were to their assigned role in an upcoming group task. Additionally, we examined whether any social cues were associated with dominance and prestige communication. In particular, previous research has suggested that smiling is related to an increase in partner-rated prestige (Witkower, Tracy, Cheng, & Henrich, 2019).

Our research centered around four hypotheses: first, we hypothesized individuals who feel their abilities are best suited to their assigned role will communicate more prestige and consequently influence group performance. Second, we hypothesized partner-rated dominance would be negatively correlated with group performance, while partner-rated prestige would be positively correlated with group performance. Third, we predicted that participants high in narcissism would prefer to be in the leadership role, and performance would suffer when the builder was narcissistic. We also hypothesized that narcissism would be associated with both partner-rated dominance and prestige communication. Fourth, we hypothesized that our preliminary examination of social cues would show distinct cues correlating with partner ratings of dominance and prestige. We will discuss the findings, limitations, and future directions for each of these hypotheses.

The Effect of the Manipulation. Contrary to our expectations, the direct effect of the manipulated feedback and role assignments had no statistically significant effect on performance, regardless of the degree to which participants believed the manipulated feedback. Moreover, the manipulated feedback and role assignment had no relationship to partner-rated dominance or prestige. When testing whether dominance and prestige had an effect on performance, we found no evidence that prestige had any effect on performance, however, dominance did relate to the number of mistakes made in the model. Further investigation revealed that builder and instructor dominance ratings interacted with one another to predict Mistakes in such a way that the more similar in dominance the partners
rated one another, the more mistakes they made. Furthermore, when accounting for builder and instructor dominance, the model showed that when the instructor received the manipulated feedback, the dyad committed more mistakes.

It is surprising that despite previous research linking dominance and prestige to self-efficacy, self-esteem, and group acceptance (Cheng, Tracy, & Henrich, 2010; Overbeck, Correll, & Park, 2005), our manipulated feedback, which aimed at increasing perceptions of role aptitude and ability, did not affect partner-rated dominance or prestige. It is possible that although general self-efficacy might affect an individual’s willingness to engage in status negotiations, task efficacy and role suitability do not. The manipulated feedback participants received is unlikely to have affected their overall beliefs about general self-efficacy, given that the content of the feedback was so task-specific. Perhaps our feedback only influenced feelings of role suitability rather than task efficacy. Results may also have contradicted previous research because that work has tended to focus on participants’ self-reports of their behavior and their beliefs about how others perceive them (Loucks-Atkinson & Mannell, 2007), rather than examining how others actually see them. People appear to be poor at estimating their own behavior and skills (Kruger & Dunning, 1999; Newell, Girgis, Sanson-Fisher, & Savolainen, 1999) and also often overestimate others’ beliefs about their positive characteristics and underestimate others’ negative perceptions of themselves (Blaine & Crocker, 1993).

Another possibility is that our attempts to manipulate feelings of task efficacy and role fitness were not effective. The feedback we gave to participants never explicitly told them they would perform well in either role, but that they would likely perform better in one of the roles. Participants therefore may not have interpreted our feedback as indicative of good ability in one of the roles. An additional consideration relating to the strength of the manipulation is that the task was perceived as difficult and participants generally believed they did worse than the average team. This might have negated any increased task-efficacy or role aptitude resulting from the manipulation. An easier task may be more useful in testing these ideas.

To investigate these issues further, research should utilize different manipulations of task efficacy, along with more precise measurement, to examine whether it actually has an
effect on dominance, prestige, and performance. Further research should attempt to more strongly influence task-efficacy by telling participants more directly they would perform better than others in the task would. It would also be beneficial for further research to include measures of generalized self-efficacy to examine the differing effects of general self-efficacy and task-efficacy.

While it was not surprising that dominance affected the number of types of mistakes made in the model, the context-specific nature of how dominance predicted mistakes was. Mistakes were fewest when one partner was high in dominance and the other was low. This finding might suggest that although dominant communication does not cause errors, competition over status does cause errors (Loch, Huberman, & Stout, 2000). Perhaps when dominant individuals go unchallenged, group performance stays relatively unchanged as there are low levels of intragroup conflict. However, when rank disagreements arise, dominance may cause more intragroup conflict and subsequently lead to group-level mistakes. It is also interesting that although mistakes differed depending on who received the manipulated feedback, they were not influenced by which role the individual was told they would perform best in. This finding indicated that after accounting for builder and instructor dominance, the previously marginally significant relationship between Targets’ Role and Mistakes became significant, indicating when instructors received feedback, the dyad made fewer mistakes. Unfortunately, in the present task, we cannot know whether the feedback is increasing mistakes among the builders or decreasing mistakes among the instructors.

An important consideration when examining the number of types of mistakes is how the types of mistakes were counted. For example, in LEGO step 13 (See Appendix H), participants placed four two-by-two grey LEGO plates on the model, but many dyads placed four white plates instead. Rather than count this as four mistakes, they were counted as one type of mistake and any subsequent mistakes stemming from that exact error (mistaking grey for white) were not counted as additional types of mistakes. We believe this type of mistake counting is appropriate for the task because similar errors in judgment in different steps can have vastly different results for how many pieces were correctly placed. Further research could examine mistakes in conceptually different ways or use different tasks more finely tuned to detect different types of mistakes.
The Effect of Narcissism. In our investigations of narcissism, we found no evidence that narcissism affected performance. Given that in previous research has shown individuals high in narcissism to manifest deficits in information sharing (Nevicka, De Hoogh, Van Vianen, Beersma, & McIlwain, 2011) and that the current task success was wholly dependent on information sharing, it was surprising that narcissism did not have an effect on objective group performance. However, as this task necessitated information sharing for any progress, there might not have been many opportunities for subtle deficits in information sharing to affect performance. Another consideration when examining narcissism and task performance is the duration of the interaction. Individuals high in narcissism are often initially perceived as competent, personable, and as good potential leaders (Brunell, et al., 2008). However, over time, their peer-perceived ratings decline as the negative aspects of narcissism manifest within the group (Ong, Roberts, Arthur, Woodman, & Akehurst, 2016). Our study utilized a short dyadic interaction, no longer than 30 minutes, which might not be enough time for the negative aspects of narcissism to manifest in a meaningful way. Future research into narcissism and performance might use tasks where information sharing is less explicitly required. Additionally, it would be interesting to longitudinally investigate narcissism and group performance to see if narcissism is negatively associated with group performance over time.

Another interesting finding regarding narcissism is its relationship with dominance and prestige. Previous research showed a positive relationship between self-reported dominance and both the NARQ dimensions of rivalry and admiration, and that prestige positively correlated with admiration, and negatively with rivalry (Zeigler-Hill, et al., Narcissism and the pursuit of status., 2019). However, we did not find any evidence that narcissism influenced peer-rated prestige. Furthermore, while we found a positive relationship between narcissistic admiration and rivalry with dominance, this relationship was only apparent for individuals in the subordinate role (i.e., builder). Previous research showing that individuals high in narcissism react poorly to subordinate role assignment (Benson, Jordan, & Christie, 2016) might help explain why only builder narcissism was associated with dominance displays. This would suggest that when individuals high in narcissism are assigned to a subordinate role, they might communicate more dominance to negotiate for higher status or to communicate their discontent with the role assignments.
However, contrary to this theory, we found little evidence that narcissism is associated with a desire to be in the leadership role (i.e., instructor) in our task. Nor did we find that narcissism was associated with negative reactions to being assigned the builder role, as builder narcissism was not associated with task frustration, or a belief that role reversal would have improved performance. Although builder narcissism was associated with increased partner frustration, instructor narcissism showed similar frustration with partners. Because of this, it is unclear to us why dominance was associated with only builder narcissism. Future research should examine what additional variables might cause individuals high in narcissism to be displeased with role assignment, as well as how this manifests from a behavioral standpoint. Possibilities include expected role responsibilities, the power discrepancy between roles, the importance of the group, and the expected longevity of the group.

Social Cues. Contrary to our hypotheses, none of our coded social cues related to either dominance or prestige. However, this preliminary exploratory study of social cues only examined 8 minutes of a 29-minute social interaction, and only 36 selected dyads, rather than the 106 total available dyads. Furthermore, interrater agreement statistics are not yet available for this task. Because of this, caution should be used in the interpretation of these results.

The most surprising finding about social cues was that smiling was not related to prestige as a previous study suggested (Witkower, Tracy, Cheng, & Henrich, 2019). Instead, smile frequency was marginally related to reduced partner perceptions of dominance. One possibility for why our results differed from research might relate to the task we used. Specifically, Witkower et al. (2019) used the Lost on the Moon task in which individuals rank-order items based on their usefulness for survival on the moon (Hall & Watson, 1970). The Lost on the Moon task is drastically different from our LEGO task and it is possible the association between smiling and prestige is more context-dependent than previously proposed. Our task took dyads, placed them in very specific roles, and gave clear responsibilities and instructions on how to be successful in the task. Conversely, this iteration of the Lost on the Moon task worked with groups of variables sizes (4-7) with no assigned roles, and where participants were not provided any guidance on how to be successful in the task. These environments are very socially different and the types of smiles commonly given in these tasks might mean different things. Anecdotally, for example, a number of the smiles
coded in our dyads seemed to occur shortly after mistakes were discovered in the model, or when communication between partners was not clear. If this is true, it might be the case smiling in the LEGO task is a social softener used to excuse errors and seek more gentle correction when one has made a mistake. As mistakes in the Last on the Moon task were likely less obvious due to the nature of rankings, these types of smiles might not have occurred within the context of their task. One interesting finding is that smiles in our task, rather than being related to competency, were related to lower dyad-level perceived performance and marginally greater mistakes. If the theory that smiles were frequently used as a social softener to excuse mistakes or corrections, it follows that the more mistakes that were made in the group should result in more smiling within the group.

While it is possible smiling might be related to status negotiations, dominance, and prestige, smiling serves many more social functions and should therefore be examined contextually. Further research should examine smiles to understand if and when they communicate prestige, dominance, reassurance seeking, or even submission.

Limitations. This study has several general limitations. First, the sample size we collected was relatively small (n = 206; 103 dyads). For our hypothesis tests, we used 2-3 predictors. Using the entire sample, we had 80% power to detect an effect size of $f^2 = .09$ using two regression predictors, or $f^2 = .11$ using three predictors. However, none of our observed effect sizes approached these magnitudes indicating our analyses are likely underpowered. Furthermore, of these 103 dyads, both partners in 88 dyads completed the dominance measure whereas 89 dyads completed the prestige measure. For our tests using dominance and prestige, we had 80% power to detect an effect of $f^2 = .11$ using two regression predictors, or $f^2 = .13$ using three predictors. None of the effect sizes in our dominance or prestige tests approached this magnitude and were therefore likely underpowered. Therefore, all of our hypotheses tests are likely underpowered and further research should examine these issues with larger sample sizes.

Additionally, our sample size was rather homogenous. Our sample was almost exclusively young undergraduates from Western University with little variation in age, and predominantly female. In particular, the male-male dyads were underrepresented. As
dominance and prestige displays work differently between genders and gender compositions (Aries, Gold, & Weigel, 1983), this might play an important role in our study.

Another important consideration is our groups. We paired participants in dyads—the smallest possible group. Some research has shown that dyads behavior substantially different compared to larger groups (Moreland, 2010). Much previous utilizing peer-reported dominance and prestige use larger groups and average multiple peer-reported rating. It seems probable that introducing more group members would affect when and how status conflicts arise, and influence the willingness of individuals to compete for status. Further research should examine how placing individuals in different seized group affect their status negotiation behaviors. Moreover, status communication might differ significantly depending on whether the task roles are pre-assigned or negotiated. In our task, the pre-assigned roles may have reduced the need for this type of communication, effectively reducing the likelihood of its occurrence.

**Final Conclusions.** Our research contributes to the extant literature in several ways. First, our research suggests that while self-efficacy has been associated with hierarchy negotiations, the extent individuals engage in hierarchy negotiations is not easily manipulated through increasing perceptions of role aptitude, nor was hierarchy communication clearly associated with preexisting beliefs about task or role ability. This suggests role fitness and efficacy might not as strongly associated with an individual’s decision to engage in status negotiations as previously thought.

Second, while research has suggested dominance and prestige communication might be an important influence on objective performance, dominance and prestige displays did not strongly correlate with performance in our task. While some evidence suggested dominance is associated with increased mistakes, dominance was not associated with any fewer correctly placed pieces. Future research should investigate further the proposed link dominance and prestige to performance.

Third, the fact that narcissism was not related to disapproval of the subordinate role nor affected objective performance metrics suggests further research might be useful to understand what motivational factors for leadership are important to individuals high in narcissism. Lastly, our research investigating social cues suggest that previous findings
linking smiles to heightened partner-rated prestige might be more situationally dependent than previous believed. Future research should focus on detangling the context of smiles and try to distinguish the potentially differing status messages different types of smiles communicate.

The conclusions drawn from our findings must be understood within the context of our specific task. We used a building task that requires strong verbal communication and information sharing skills. However, it also uses a LEGO model, experience with which differs by gender and nationality. Because many of our participants were female, they may not have had much prior experience with LEGO and therefore may not have been particularly high on efficacy for the task. Other tasks might provide different results. Further research should therefore examine role self-efficacy and role suitability in a variety of tasks to better understand these relationships.
References


Appendices

Appendix A: Ethical Review Board Approval

Date: 14 January 2019
To: Dr. Erin Hoey
Project ID: 110959
Study Title: An Investigation of Social Cue Exchange in Teaching and Learning
Application Type: Continuing Ethics Review (CER) Form
Review Type: Delegated
Meeting Date: 01/Feb/2019
Date Approval Issued: 14/Jan/2019
REB Approval Expiry Date: 08/Feb/2020

Dear Dr. Erin Hoey,

The Western University Non-Medical Research Ethics Board has reviewed this application. This study, including all currently approved documents, has been re-approved until the expiry date noted above.

REB members involved in the research project do not participate in the review, discussion or decision.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,
Daniel Wryszutki, Research Ethics Coordinator, on behalf of Prof. Randal Graham, NMREB Chair

Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).
Appendix B: Letter of Information.

Project Title: An Investigation of Social Cue Exchange in Teaching and Learning

Document Title: Letter of information

Principal Investigator: Dr. Erin Heerey, PhD

Invitation to Participate: You are being invited to participate in a research study investigating how social cues exchanged in a naturalistic environment shape how people perceive one another. You are being invited to participate because you signed up for the study on SONA.

Why is this study being done? The purpose of this study is to understand how various verbal and nonverbal social cues affect person perception and the outcomes of social interactions.

How long will you be in this study? Participation takes about 1.5 hours and the session will take place in the social psychology research rooms (6400 Block SSC).

What are the study procedures? If you decide to participate, we will ask you to:

- Get to know your partner (all interactions will be video recorded).
- Work together with a partner to build a LEGO set.
- Answer some questionnaires that ask about aspects of your own personality, enjoyment of social interactions, interaction quality and perception of the partner within the study session, and your mood.

What are the risks and harms of participating in this study? This is a low-risk study and there are no known harms to participating. The main risk to you is that you may feel uncomfortable answering some of the questions on the questionnaires. If this occurs, you may skip those items. You may also find the building task frustrating or uncomfortable at times (we have built in regular breaks to help reduce this feeling). If you do feel frustrated, you may talk to the experimenter to discontinue your participation at any time.

What are the benefits of participating in this study? Other than that you might find it interesting, there is no direct benefit to you for participating in this study. However, your participation might help us to understand how the social cues one person provides affect how others perceive him or her.
**How will participants' information be kept confidential?** All information we obtain from you is confidential. All data will be collected using a unique participant code. These data will be collected electronically and stored in password-protected, encrypted files for a minimum of 7 years. Identifying information such as your video files will be stored securely and separately from the main study information and only linked via a unique participant ID. Videos of the social interactions will be coded by trained human coders, working in conjunction with a computerized coding program. The coders work under strict confidentiality guidelines and will never be people that you personally know. While we do our best to protect your information there is no guarantee that we will be able to do so. You will have a chance to specifically consent to several possible uses of the video recordings we make (see ‘Video Uses Consent Form’ below). The inclusion of your video record may allow someone to identify you. To minimize this possibility, we do not transport data off campus, unless you specifically consent to its release, and all video/audio data are confined to campus servers/hard-drives protected by the UWO firewall and building security protocols. All video data will be destroyed after 7 years, unless you specifically consent to its use in published articles or presentations. If you consent, and if your data are used in this way, they may exist permanently in the public domain.

Usually it is only the research staff that will have access to the data. However, representatives of The University of Western Ontario Non-Medical Research Ethics Board may require access to your study-related records to monitor the conduct of research. In addition, in the interest of promoting research transparency and facilitating independent scrutiny of our data, anonymized data from the study (no video data) will be uploaded onto the lab’s Open Science Framework (OSF) site (osf.io/p6n3b) and made available to interested scientists. These public data will use an anonymous study ID that cannot be linked back to you. If the study results are published, no information that identifies you will be included.

Please note that although we will not reveal what you specifically talk about to others, the people you meet in the study may do so. We encourage all participants to use their discretion in terms of what they reveal during the interactions. We also encourage all participants to respect the people they meet by refraining from discussing individual conversations after the study session.

**Can participants choose to leave the study?** Participation in this study is voluntary. You are free to withdraw from the study at any time and without penalty, even after the research has concluded. You do not need to provide a reason. You may withdraw from the study by telling the experimenter or by contacting Dr. Erin Heerey ([        ]) and submitting your participant code as it appears below. All data associated with your code will then be destroyed.

**Are participants compensated for their time?** This is a 1.5-hour study. If you are a Psychology 1000 student, you will receive 1.5 SONA credits for participating. If you are participating in the context of a different class, you will receive compensation based on the information provided in the course syllabus. If you have any questions about the compensation, please review your course syllabus or contact the Instructor.
**What are the rights of participants?** Your participation in this study is voluntary. You may decide not to be involved. Even if you consent to participate, you have the right to not answer individual questions or to withdraw from the study at any time. If you choose not to participate or choose to leave the study, it will have no effect on your academic standing. If new information is learned during the study that might affect your decision to stay in the study we will inform you of this. You do not waive any legal right by consenting to the study.

**Whom do participants contact for questions?** If you would like more information, please contact Dr. Erin Heerey via email ( ) or phone ( ).

If you have any questions about your rights as a research participant or concerns about the conduct of this study, you may contact The Office of Human Research Ethics ( ), email: ( ).

If you decide to participate, your participant code is: ________________________________

**When the computer program starts, you will be asked to affirm (say “yes” to) the following items:**

- I have read and understood the Letter of Information.
- I understand that my interactions will be video recorded and these data analyzed as described in the Letter of Information.
- Any questions I chose to ask have been answered to my satisfaction.
- I understand that I may withdraw from the study at any time and do not need to provide a reason for doing so.
- I understand that I may withdraw from the study by emailing Dr Heerey my participant code.
- I understand that I am free to skip any questionnaire items that I do not wish to answer.
- I am aware that my anonymized data (excluding video images) will be uploaded onto the lab’s Open Science Framework site (OSF) to promote research transparency and verification.
- If I consent to participate, I promise that I will participate conscientiously and to the best of my ability.
- I consent to participate.

**Affirming these items indicates that you consent to participate.**

Once you consent to study participation will also be asked to complete a Video Uses Consent Form on the computer.

As you know, the primary purpose for video recording the interactions is so that we can answer research questions related to how people use different social and behavioural cues to create perceptions of different people. You have agreed that we may use your video record for this purpose. However, we sometimes use videos for other purposes such as training other researchers in data analysis, demonstrating our experimental procedures in seminars and presenting our findings at conferences. Please decide which (if any) of the following possible uses of your video you consent to by affirming or denying each. You may consent to as many or as few of these uses as you wish. We will only use your video recordings in ways that you have consented to. You may still participate in the study, even if you do not consent to any of these additional
possible uses of your video. Note that consenting to these items does not guarantee that your videos will be used in these ways.

- My videos may be used within the lab to help train future research assistants in research techniques (within the 7-year data retention period).
- My videos may be viewed and coded for measured of interaction quality by other participants in future studies (within the 7-year data retention period).
- My videos (or still photos from them) may be shown to other researchers at conference/seminar presentations (within the 7-year data retention period; note that this means that one or more videos/images including you may leave protected institutional servers).
- My videos (or still photos from them) may be included in published articles and thesis materials (note that this means that one or more videos/images including you may leave protected institutional servers and that these videos/images may exist permanently in the public domain).
- My videos may be shown to the general public as part of research reports or media stories detailing our findings (note that this means that one or more videos/images including you may leave protected institutional servers and that these videos/images may exist permanently in the public domain).
- My videos may be shown to interested students at Western University in the context of social psychology classes (note that this means that one or more videos/images including you may leave protected institutional servers and that these videos/images may exist permanently in the public domain).

Please keep this letter for future reference.
Appendix C: Paid Advertisement.

PARTICIPANTS NEEDED FOR A STUDY OF TEACHING AND LEARNING

Requirements:
• 18 years or older

Participation requires visiting our laboratory at Western for a 90-minute study where participants complete an interactive task. You will be compensated $15 for your time.

This study is about the social cues people exchange in a naturalistic interaction and how those cues affect interpersonal perceptions. This study takes place in pairs. If you participate in this study, we will ask you to:
• Get to know the other participant
• Work together to complete a timed object building task
• Answer some questionnaires about aspects of your personality, enjoyment of social interactions, experience in the study, interactions, and your mood

The session will be video recorded for offline analysis of social behaviour.

To participate in this study, please contact us by using the attached QR code or the link.

If you have any questions or comments, please contact Lynden Jensen at [blank].

https://tinyurl.com/UVOPSY
Appendix D: Measures.

Positive and Negative Affect Schedule (PANAS)


This scale consists of a number of words that describe different feelings and emotions. Read each item and then select the number from the scale for each word. Indicate to what extent you feel this way right now, that is, at the present moment. If you wish to skip an item, you may leave it blank.

<table>
<thead>
<tr>
<th></th>
<th>1 Very Slightly or Not at All</th>
<th>2 A Little</th>
<th>3 Moderately</th>
<th>4 Quite a Bit</th>
<th>5 Extremely</th>
</tr>
</thead>
</table>
1) Interested
2) Distressed
3) Excited
4) Upset
5) Strong
6) Guilty
7) Scared
8) Hostile
9) Enthusiastic
10) Proud
11) Irritable
12) Alert
13) Ashamed
14) Inspired
15) Nervous
16) Determined
17) Attentive
18) Jittery
19) Active
20) Afraid
Short Transformational Leadership Scale


Note for reviewers: This scale was originally developed for working professionals. The language has been adapted to suit a broader audience.

For the following questions, consider times you have worked on a team to accomplish a task or project. Please indicate the extent to which the following statements describe your behaviors in a team setting. If you wish to skip an item, you may leave it blank.

<table>
<thead>
<tr>
<th></th>
<th>1 Completely Disagree</th>
<th>2 Disagree</th>
<th>3 Neither Agree nor Disagree</th>
<th>4 Agree</th>
<th>5 Completely Agree</th>
</tr>
</thead>
</table>
- I speak enthusiastically.
- I respect other opinions than mine.
- I listen attentively to others.
- I am optimistic about the future.
- I support teammates who need help.
- I communicate my vision of the future.
- I include others in problem-solving processes.
- I respect other people's feelings.
- I share information with my teammates.
- I am cheerful.
- I take into account the needs of my teammates when I make decisions.
- I do not return phone calls or emails.
- I particularly recognize good work.
- I recognize when teammates do good work.
- When I see that someone is having problems, I make sure that the problem gets fixed.
- I am not available when people need me.
- I congratulate everybody when they do good work.
- I follow-up on tasks to find out if there are any problems, and if necessary, I correct them.
- I reprimand teammates who do not follow the rules.
- I am not available.
Interaction Questionnaire

Note: This questionnaire is modified from the post interaction questionnaire use in Heerey & Crossley, 2013; Psychological Science (24, 1446-1455). The task-specific items are based on the LEGO building task participants did in the present study.

This set of questions concerns your views of the building task you just participated in with your partner. Please read each statement and answer it honestly and as accurately as you can. Do not think too long about the statements. Work quickly and try to answer as accurately as possible. There are no right or wrong answers. If you wish to skip an item, you may leave it blank.

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<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

Manipulation Questions

Before Task

- The computer will randomly assign you to a role. How well do you think you will perform if the computer assigns you to the following roles:
  - Builder [scale: Poor, Fair, Good, Very Good, Excellent]
  - Instructor [scale: Poor, Fair, Good, Very Good, Excellent]

[Participants who received the manipulation only]
- How strongly do you agree with this feedback?

After Task

- How well do you feel you performed in your role as the [Builder/Instructor]? [scale: Poor, Fair, Good, Very Good, Excellent]
- Now that you have experienced the task, how well do you think you would have performed if you had originally been assigned to the other role ([Builder/Instructor])? [scale: Poor, Fair, Good, Very Good, Excellent]

[Participants who received the manipulation only]
- Now that you have experienced the task, how strongly do you agree with the feedback you received before beginning?
Post-Task Questions
- The task was fun and engaging.
- The task was frustrating at times.
- I really worked hard to get as far as possible on the model.
- We completed more of the model than the average team would. The interactions I had during the task felt smooth and coordinated.
- I felt comfortable during the task.
- I did a good job in my role.
- At least 150 teams will participate in this task. How well do you think your team did in constructing the LEGO model compared to other teams?
  - [slider question] We did better than: [no teams (0%) - all teams (100%)]

Partnership Questions
- My partner is similar to me.
- My partner is similar to my friends.
- My partner is an attractive person.
- My partner has a good sense of humor.
- My partner is a kind person.
- My partner is a charming person.
- My partner is someone I would enjoy spending time with.
- My partner did a good job in their role.
- I was frustrated with my partner.
- My partner contributed more to our progress than I did.
- I cared a lot about how far we got on the model.
- My partner cared a lot about how far we got on the model.
- My partner was egotistical, self-focused, and vain.
- My partner dominated the conversation.

Role Questions
- The task would have gone more smoothly if the roles were reversed.
- If I had been assigned my partner’s role, I would have done it better than they did.
- If my partner had been assigned my role, they would have done it better than I did.
- The strategy breaks increased our effectiveness.
- It was fun to strategize with my partner.
- It was hard to get my partner talking.
- I felt comfortable during strategy breaks.
- It would have been useful to have more time to strategize.

Leadership Questions
- Self Measures
  - Generally, I feel that I am a good leader.
  - I mainly led our team in this task.
  - I feel that generally, I am a competent person.
  - I enabled my partner to do better in their role.
- I communicated clearly with my partner.
- I tried to make it feel like we were really working together on the task.

**Partner Measure**
- Generally, I feel that my partner is a good leader.
- My partner mainly led our team in this task.
- My partner is generally a competent person.
- My partner enabled me to do better in my role.
- My partner communicated clearly with me.
- My partner made it feel like we were really working together on the task.
- [Slider Question] Who contributed more to your teams’ success? [Me – My Partner]
- [Slider Question] Who led our team’s efforts? [Me – My Partner]
- [Slider Question] Who tried to succeed most? [Me – My Partner]

- Before today, had you ever constructed the Arc de Triomphe LEGO model? [Scale: Yes/No]
- How much experience do you have with LEGO or similar building products? [Scale: 1 (none), 2, 3, 4 (a moderate amount), 5, 6, 7 (extensive)]
- In the past year, how frequently did you play with LEGO or similar building products? [Scale: 1 (never) to 7 (every day)]
Perceived Criticism (modified from the original to be task specific)


Please read each of the following items and rate how much you agree with the item using the scale below. If you wish to skip an item, you may leave it blank.

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<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

- My partner gave me feedback on how I could do my role better.
  
  If yes:
  - The feedback I received increased task effectiveness.
  - The feedback I received increased team unity.

- I gave my partner feedback on how they could do their role better.
  
  If yes:
  - The feedback I gave increased task effectiveness.
  - The feedback I gave increased team unity.

- My partner was critical of me.
  
  If yes:
  - The criticism I received increased task effectiveness.
  - The criticism I received increased team unity.

- I was critical of my partner.
  
  If yes:
  - The criticism I gave increased task effectiveness.
  - The criticism I gave increased team unity.
Autism-Spectrum Quotient (AQ)


Choose the response that best describes how strongly each item applies to you. If you wish to skip an item, you may leave it blank.

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</thead>
<tbody>
<tr>
<td></td>
<td>Definitely Agree</td>
<td>Slightly Agree</td>
<td>Slightly Disagree</td>
<td>Definitely Disagree</td>
</tr>
</tbody>
</table>

1) I prefer to do things with others rather than on my own.
2) I prefer to do things the same way over and over again.
3) If I try to imagine something, I find it very easy to create a picture in my mind.
4) I frequently get so strongly absorbed in one thing that I lose sight of other things.
5) I often notice small sounds when others do not.
6) I usually notice car number plates or similar strings of information.
7) Other people frequently tell me that what I’ve said is impolite, even though I think it is polite.
8) When I’m reading a story, I can easily imagine what the characters might look like.
9) I am fascinated by dates.
10) In a social group, I can easily keep track of several different people’s conversations.
11) I find social situations easy.
12) I tend to notice details that others do not.
13) I would rather go to the library than a party.
14) I find making up stories easy.
15) I find myself drawn more strongly to people than things.
16) I tend to have very strong interests, which I get upset about if I can’t pursue.
17) I enjoy social chitchat.
18) When I talk, it isn’t always easy for other to get a word in edgewise.
19) I am fascinated by numbers.
20) When I am reading a story, I find it difficult to work out the character’s intentions.
21) I don’t particularly enjoy reading fiction.
22) I find it hard to make new friends.
23) I notice patterns in things all the time.
24) I would rather go to the theater than to a museum.
25) It does not upset me if my daily routine is disturbed.
26) I frequently find that I don’t know how to keep a conversation going.
27) I find it easy to “read between the lines” when someone is talking to me.
28) I usually concentrate more on the whole picture, rather than on small details.
29) I am not very good at remembering phone numbers.
30) I don’t usually notice small changes in a situation of person’s appearance.
31) I know how to tell if someone listening to me is getting bored.
32) I find it easy to do more than one thing at once.
33) When I talk on the phone, I’m not sure when it’s my turn to speak.
34) I enjoy doing things spontaneously.
35) I am often the last to understand the point of a joke.
36) I find it easy to work out what someone is thinking or feeling just by looking at their face.
37) If there if an interruption, I can switch back to what I was doing very quickly.
38) I am good at social chitchat.
39) People often tell me that I keep going on and on about the same thing.
40) When I was young, I used to enjoy playing games involving pretending with other children.
41) I like to collect information about categories of things (e.g., types of cars, birds, trains, plants).
42) I find it difficult to imagine what I would be like to be someone else.
43) I like to carefully plan any activities that I participate in.
44) I enjoy social occasions
45) I find it difficult to work out people’s intentions.
46) New situations make me anxious.
47) I enjoy meeting new people.
48) I am a good diplomat.
49) I am not very good at remembering people’s dates of birth.
50) I find it very easy to play games with children that involve pretending.
Big-Five Inventory


Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please indicate the extent to which you agree or disagree with each statement. If you wish to skip an item, you may leave it blank.

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<tbody>
<tr>
<td>1.</td>
<td>Is talkative</td>
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<tr>
<td>2.</td>
<td>Tends to find fault with others</td>
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<tr>
<td>3.</td>
<td>Does a thorough job</td>
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<td>4.</td>
<td>Is depressed, blue</td>
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<tr>
<td>5.</td>
<td>Is original, comes up with new ideas</td>
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<tr>
<td>6.</td>
<td>Is reserved</td>
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<tr>
<td>7.</td>
<td>Is helpful and unselfish with others</td>
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<tr>
<td>8.</td>
<td>Can be somewhat careless</td>
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<tr>
<td>9.</td>
<td>Is relaxed, handles stress well</td>
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<tr>
<td>10.</td>
<td>Is curious about many different things</td>
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<tr>
<td>11.</td>
<td>Is full of energy</td>
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<tr>
<td>12.</td>
<td>Starts quarrels with others</td>
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<tr>
<td>13.</td>
<td>Is a reliable worker</td>
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<td>14.</td>
<td>Can be tense</td>
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<tr>
<td>15.</td>
<td>Is ingenious, a deep thinker</td>
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<tr>
<td>16.</td>
<td>Generates a lot of enthusiasm</td>
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<tr>
<td>17.</td>
<td>Has a forgiving nature</td>
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<td>18.</td>
<td>Tends to be disorganized</td>
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<tr>
<td>19.</td>
<td>Worries a lot</td>
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<tr>
<td>20.</td>
<td>Has an active imagination</td>
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<tr>
<td>21.</td>
<td>Tends to be quiet</td>
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<tr>
<td>22.</td>
<td>Is generally trusting</td>
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<tr>
<td>23.</td>
<td>Tends to be lazy</td>
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<td>24.</td>
<td>Is emotionally stable, not easily upset</td>
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<tr>
<td>25.</td>
<td>Is inventive</td>
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<tr>
<td>26.</td>
<td>Has an assertive personality</td>
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<tr>
<td>27.</td>
<td>Can be cold and aloof</td>
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<tr>
<td>28.</td>
<td>Perseveres until the task is finished</td>
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<tr>
<td>29.</td>
<td>Can be moody</td>
<td></td>
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<tr>
<td>30.</td>
<td>Values artistic, aesthetic experiences</td>
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<tr>
<td>31.</td>
<td>Is sometimes shy, inhibited</td>
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<tr>
<td>32.</td>
<td>Is considerate and kind to almost everyone</td>
<td></td>
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<td></td>
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<tr>
<td>33.</td>
<td>Does things efficiently</td>
<td></td>
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<tr>
<td>34.</td>
<td>Remains calm in tense situations</td>
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<tr>
<td>35.</td>
<td>Prefers work that is routine</td>
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<tr>
<td>36.</td>
<td>Is outgoing, sociable</td>
<td></td>
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<tr>
<td>37.</td>
<td>Is sometimes rude to others</td>
<td></td>
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</tr>
<tr>
<td>38.</td>
<td>Makes plans and follows through with them</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>Gets nervous easily</td>
<td></td>
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<tr>
<td>40.</td>
<td>Likes to reflect, play with ideas</td>
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<tr>
<td>41.</td>
<td>Has few artistic interests Self Report Measures for Love and Compassion Research: Personality</td>
<td></td>
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<tr>
<td>42.</td>
<td>Likes to cooperate with others</td>
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<tr>
<td>43.</td>
<td>Is easily distracted</td>
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</tr>
<tr>
<td>44.</td>
<td>Is sophisticated in art, music, or literature</td>
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</table>
**Dominance-Prestige Scales** *


**Partner Report:** (* Section modified for a 2-person group rather than a 4-person group)

Please indicate the extent to which each statement accurately describes your partner by writing the appropriate number from the scale below in the space provided. If you wish to skip an item, you may leave it blank.

<table>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very Much</td>
</tr>
</tbody>
</table>

1. I respect and admire my partner.
2. I do NOT want to be like my partner.
3. My partner enjoyed having control over the task.
4. I expected my partner to be successful.
5. My partner often tried to get his/her own way regardless of what I wanted.
6. I did NOT value my partner’s opinion.
7. My partner was willing to use aggressive tactics to get his/her way.
8. I held my partner in high esteem.
9. I felt that my partner tried to control the situation too much.
10. My partner does NOT have a forceful or dominant personality.
11. It was easier to let my partner have his/her way than to try to lead him/her.
12. My partner did NOT enjoy the authority associated with his/her role.
13. I recognized my partner’s unique talents and abilities.
14. I think my partner is an expert at this type of task.
15. I would seek my partner’s advice on a variety of matters.
16. My partner was intimidating.
17. I did NOT enjoy the time I spent with my partner during this session.
Narcissistic Admiration and Rivalry Questionnaire (NARQ)


Please indicate how much each of the following statements applies to you. If you wish to skip an item, you may leave it blank.

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<tr>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not agree at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Agree completely</td>
</tr>
</tbody>
</table>

1. I am great.
2. I will someday be famous.
3. I show others how special I am.
4. I react annoyed if another person steals the show from me.
5. I enjoy my successes very much.
6. I secretly take pleasure in the failure of my rivals.
7. Most of the time I am able to draw people’s attention to myself in conversations.
8. I deserve to be seen as a great personality.
9. I want my rivals to fail.
10. I enjoy it when another person is inferior to me.
11. I often get annoyed when I am criticized.
12. I can barely stand it if another person is at the center of events.
13. Most people won’t achieve anything.
14. Other people are worth nothing.
15. Being a very special person gives me a lot of strength.
16. I manage to be the center of attention with my outstanding contributions.
17. Most people are somehow losers.
18. Mostly, I am very adept at dealing with other people.
Demographic and Final Questions

What is your age in years? (free response)

What is your gender?
- Male
- Female
- Other (free response)

What is your ethnicity? (free response)

What is your first language?
- English
- Other
  - What is your first language? (free response)
  - What is your second language? (free response)

(If first language not English) How fluent in English are you?
- Elementary proficiency
- Limited working proficiency
- Professional working proficiency
- Full professional proficiency
- Native or bilingual proficiency

Did you know the experimenter prior to today? (Yes/No)
  - [Yes] How do you know him/her? (free response)

Did you know your partner prior to today? (Yes/No)
  - [Yes] How do you know him/her? (free response)
  - [Yes] How long have you known him/her? (free response)
Appendix E: Instructors Script.

1. Setup
   a) Record expected SONA IDs on participant checklist
   b) Input the participant ID on the Letters of Information (LOI) (e.g. LGO-001-001) and place LOI on the individual computer.
   c) On the individual computers, open “PythonShortcut” in the “LEGOFiles” folder on your desktop
   d) Input participant information corresponding to the LOI and submit to bring up the survey
   e) Setup the building room with tables, chairs, partitions, LEGO (ensure it is deconstructed), task aids, cameras, and instructional computer.
   f) Open “PythonShortcut” in the “LEGOFiles” folder on your desktop and input dyad number in both fields

2. Pre-task Survey

   Once it is time to start the experiment, go to lobby to find participants:
   “I am looking for participants for the study, ‘An Investigation of Social Cue Exchange in Teaching and Learning.’ May I have your SONA ID please?”

   Bring participants into their pre-task rooms:
   “Please have a seat and read our Letter of Information. I’ll be back in a moment.”

   Credit the participants on SONA or check their name on the participant roll

   When you return:
   “Did you have any questions about what you read?

   I want to describe a little more about today’s study. This study has three parts:
   1. First, you will complete a survey here.
   2. After that I will take you to another room complete a task with a partner.
   3. After that, you will come here to do another survey.

   For this survey, the first page is our consent form, which says you are willing to help us with this study. To participate in the study, you need to say ‘yes’ to all the items or the computer will not let you participate.

   Do you have any questions?

   I will give you some time to complete the survey. Once you and your partner have both completed your surveys I will bring you into the other room.”

   Once both participants have completed the survey, bring them together into the building task room. Use the following protocol to invite them to move rooms:
   “Are you ready? Can you tell me what role the computer assigned you?”
“I will take you to the building task room now. Please leave all your personal items here and follow me. “

Close the door to secure any items they might have left (it will lock)

3. Building Task

Seat participants in their appropriate seats. Give these instructions:

“For this portion of the study, you will have 20 minutes to build a LEGO model of the “Arc de Triomphe.”

Briefly show them the cover of LEGO scoring aide

“The model is complicated – so we do not anticipate any group being able to finish it but we would like to see how far you can get and how many pieces you can correctly place. If you are interested, I can let you know how you did relative to other teams after the experiment.

In this task, there are two roles—the ‘Instructor role’ and the ‘Builder role.’”

Directions to the Instructor

Gesturing to the Instructor:

“The Instructor is the only one who can see the instructions. The official LEGO instructions will be displayed page-by-page on this computer. You can use the ‘2’ key to see the next page and the ‘1’ key to see the previous pages. Feel free to skip ahead in the instructions to see future steps. You can use any words or strategies you would like to help your partner complete the task.”

Directions to the Builder

Gesturing to the Builder:

“The Builder is the only one who can view and build the LEGO. You are not allowed to raise the model or any connected LEGO pieces above the partition. However, you can raise unconnected pieces of LEGO above the partition to show your partner.”

Demonstrate lifting pieces above the partition

Strategy Breaks

“While you will have 20 minutes to build the model, the computer will also give you three ‘strategy breaks,’ which are each three-minutes long. During these breaks, the computer will take away the instructions. However, during this time the Builder is allowed to raise the model and any connected pieces above the partition. You are also free to continue building.

- Some people use these breaks to organize the LEGO pieces into shapes or colors.
• Some people use these breaks to discuss the vocabulary they are using or give each other feedback.
• Some people try to continue to build the model from memory, even without the instructions.
• However, feel free to use these breaks as you see fit. While we ask you to keep to the basic rules outlined in the task aid in front of you, feel free to try any strategies you think might give you an advantage. The one thing we ask is you stay in your seats, so our cameras can film you.

These three strategy breaks are set to occur every five minutes during the build time. Once all build time and breaks are completed, the computer will let you know that the task is complete.

Are there any questions?”

**LEGO Vocabulary**

**Pointing to the task-aids**

“You each have a task-aid, which you will keep during the build with some useful information on it.”

**Pointing to the colors**

“On it are the common colors in the model…”

**Pointing to the shapes**

“As well as some examples of some basic LEGO pieces, which I will go over now.”

**Display a Blue 2x2 Brick**

“These LEGO pieces are called ‘bricks’ and are described by their color and how many studs, or bumps, they have on the top. For instance, this brick would be called a ‘blue two-by-two brick’ because it is blue, and it has a width of two studs and a length of two studs.”

**Display a Tan 4x6 Plate**

“This is a plate. It is similar to a brick but a third the height. This piece would be called a ‘tan four-by-six plate.’”

**Display a Black 1x6 Tile**

“This is a tile. It is similar to a plate but do not have any studs. These are still described by how many studs they would have. So, this piece would be called a ‘black one-by-six tile.’”

**Display a custom piece**

“In this set, there are several specialized pieces. However, this basic vocabulary should give you a framework in which to describe LEGO pieces.”
Do you have any questions?
I’m going to set up the cameras, please review your tasks-aids and we will start in a minute.”

Make sure the cameras have a good torso shot of the participant and straight-on as possible. You might need to zoom in or adjust. Press record on both cameras once you have a good shot.

“Once the build time and breaks are completed, the computer will let you know. Once it tells you the task is finished, please let me know.”

Hit the spacebar to start the instructions
“Your time begins now”

Leave the room with the door cracked

4. Post-task Survey

Approaching 30 minutes later, listen outside the door for when the task is completed. Once the task is complete, enter the room, stop the video recording, and bring them back to their respective rooms:

“Please follow me; I will take you back to your original rooms to complete the final survey. Once you are finished just stay at your desk and I will come by with further instructions.”

Go back to the task room and make sure there are no LEGO pieces on the ground or table. Score the LEGO model, deconstruct, and pack away.

- Press “space” on the task computer to finish the EPrime program
- Pull up the LEGO Scoring document on the desktop and fill in the relevant fields:
  - What was the last step on the instructions they finished?
  - How many pieces did they place?
  - How many pieces were correctly placed?
  - How many types of mistakes did they make?
  - If you have questions or are uncertain, you can take a picture or video of the model to review with another researcher. If a model is particularly good or bad, you might take a picture of it for future presentations on this study.
- Close the google document
- If running another study today, start the program again by hitting “EPrime.Ink” on the desktop and inputting the new dyad number in the two fields
- When leaving room, leave it open only a cracked so new participants traveling in the hallway cannot see the LEGO

After the participants complete survey:

“Thank you for participating in this study. Did you have any questions about the study?”
If they request a hard copy of the debriefing form, give it to them.

“Please make sure you have all your personal belongings, you are free to leave. The exit is just down this hall.”

5. End-of-day Wrap-up
   a) Upload the EPrime files in “LEGOFile\Eprime” to the google folder on the desktop
   b) Turn off all computers
   c) Reorganize the building room
   d) Put away camera, LEGO, and materials in room _____
   d) Export camera files to the hard drive (Currently using the hard drive “d3”)
      a. Extract both microSD from SD card adapter in camera
      b. Plug hard drive in and connect it to same computer
      c. Place in card readers and insert into computer USB slots (front or back) or directly into the hard drive
      d. Move files from the microSD card (in the DCMI folder) to the hard drive in under “Lynden Files,” in the correct subfolder (“Builder” or “Instructor”), and in a folder named after the date of recording (MM/DD/YY), which you will need to create.
      e. We will eventually give each file a format:

```
<table>
<thead>
<tr>
<th>Study ID</th>
<th>Dyad #</th>
<th>Version</th>
<th>Participant #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

E.g., ‘LGO-001-1001’

f. You might need to leave the files to transfer overnight. Just leave a note by the computer if you need to (as others might need to use the computer later).

E.g., ‘LGO-001-1001’

e) Close all doors behind you
Exception Management

If a participant:

- **Fails to show up after 15 minutes**
  For participants that showed up, place a ✓ next to their name on the roll. For the participant who did not show up, place a ✗ next to their name on the roll. If no valid excuse, Lynden will mark them as an unexcused absence and they will need to make up 1.5 SONA credits this semester.

- **Declines the consent or leaves early**
  Make a note. Give both participants credit. Release both participants at next break.

- **Crashes the survey**
  Hit ‘Submit’ again on the ‘Experimental Information’ screen using the same information previously entered. This should survey the window and bring them to their last page.

- **Crashes the survey and closes python window**
  1. Relaunch the python code by opening the shortcut (“Desktop\PythonShortcut.lnk”)
  2. Re-input the data and hit submit. This should bring them back to where they left off

- **Discloses to you or their partner their feedback or**
  Make a note. Do your best to retain the same behavior as if they did not disclose anything.

- **Asks you about the feedback prior to the end of the study or asks why only some people got feedback prior to the end of the study**
  Make a note. State something to the effect of: “I don’t know what the computer told you, it is gives some players feedback depending on their scores – but it doesn’t give everyone feedback.”

- **Crashes Eprime on instruction computer**
  Make a note. Restart the program using the shortcut (“Desktop\EPrimeShortcut.lnk”) call the session “2” when you re-enter the ID rather than the dyad number.

- **Knocks over boxes/partition/LEGO, hits camera, or various task-issues**
  Fix it as unobtrusively and quickly as possible while participants continue (if possible). Make a note.

- **Asks if a LEGO piece is missing**
  Make a note. Tell them all the pieces should be there last that we checked. Ask them to move on to the next step if possible. If it is indeed missing, we need to have this replaced by our backup set or get a new piece for next round.

- **Ask about color of LEGO or definitions during the task**
  Respond to their questions as appropriate, however, make note if they frequently ask questions.
• **Cheats**
  Make a note.

• **Asks how they did compared to others**
  Say something to the extent of, “I’ll score the model while you are doing the last survey and then I will let you know at the end of the experiment.”
  View the statistics in the LEGO excel folder to let them know how they did.

• **Asks if they can skip the breaks**
  Say something to the extent of, “You cannot skip the breaks, but you can use the breaks in any you would like. If you don’t find them useful, you could just use them to get to know one another – which might help you communicate better in the task.”
Appendix F: Debriefing Form.

DEBRIEFING FORM

An Investigation of Social Cue Exchange in Teaching and Learning

The purpose of this research is to understand how beliefs about task ability affect group discussion, feedback, collaboration, and following behavior.

To learn about this, we asked you to participate in a collaborative building task. Before this activity, some participants received information about how they were expected to perform. Some were told they were likely good Builders, while others were told they were likely good Instructors. Some were not told anything regarding their expected performance. However, all this information was randomly assigned and not determined by any measurements from surveys.

If you have questions or would like more information, please email Dr. Erin Heerey (          ). If you are worried or distressed about participating in this study please tell the experimenter. Alternately, you may make an individual counselling appointment by attending the walk-in clinic at Western University Psychological Services (    ) or phoning a help line (e.g., Good2Talk [    ]; the London Distress Centre [    ]).

If you would like to learn more about the study results, we would be happy to provide them once data collection is complete. Note that we will only be able to provide you with general results and will not be able to tell you about your specific performance. Please email Dr. Erin Heerey at the email address above if you wish to receive a study summary. We will be able to provide this to you once data analysis is complete.

References for Further Reading:


Thank you for participating!
Appendix G: Task Aid.

**Basic Lego Vocabulary**
- Studs
- Blue 2x2 Brick
- Tan 4x6 Plate
- Black 1x7 Tile

**Common Colors**
- Black
- Tan
- Dark Tan
- White
- Gray
- Blue

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**Rules for Builder:**
- Please stay in your seat until the task is completed
- You may raise unconnected Lego pieces above the partition (but not the full model).
- You can continue to connect pieces even during strategy breaks

**Rules for Instructor:**
- Please stay in your seat until the task is completed
- You may view the model during the strategy breaks
- Refrain from handling any Lego
Appendix H: LEGO Instructions.

The following is a modified version of official LEGO instructions, with any irrelevant information removed (e.g., facts about the Arc de Triomphe). This copy is identical to what the Instructor viewed, except they were not able to number range on the top-right corner, which indicates how many pieces in the mode should be in the model before and after that step and only viewed one page at a time.
Instructions for assembling the LEGO model:

1. Place the first component.
2. Attach the second component.
3. Connect the third element.
# Curriculum Vitae

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