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Inherently Relational: Interactions between Peers' and Individuals' Personalities Impact Reward Giving and Appraisal of Individual Performance

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ABSTRACT

Introverted individuals may experience and evaluate their dyadic work relationships differently than extraverts. In two studies, we investigated the interaction effect of an individual's and observing peer's personality traits on performance evaluations and reward giving. Study 1 showed that introverted (but not extraverted) peers consistently evaluated extraverted and disagreeable (but not introverted and agreeable) individuals' performance as lower. Study 2 replicated these findings with regard to performance evaluation and reward giving using an experimental design that manipulated actor personality and held objective performance constant. The results also showed that introverts' trait sensitivity and negative person impressions mediated these relationships. Overall, results support an information utilization model of interpersonal dyadic evaluation, wherein introverts are more sensitive to interpersonal personality traits than their extraverted counterparts, incorporating interpersonal traits in person impressions and subsequent evaluations and reward distributions. We conclude with implications for dyadic workplace interactions, personality, and sources of emergent dyadic influences on performance evaluation.

The relationships we have with coworkers can profoundly impact our work experiences, well-being, and productivity. Recent findings that having a best friend at work is a key indicator of engagement (Buckingham & Coffman, 1999) and that employees often search for a sense of community in the workplace (Klein & D'Aunno, 1986; Pfeffer, 2006) bolster the notion that relational counterparts are especially relevant to our work experience. For example, work design research shows that interpersonal relationships have strong impacts on jobs, roles, and tasks (Grant & Parker, 2009). Relationships between coworkers are some of the strongest determinants of well-being (Myers, 1999) and perceptions of meaningful work (Gersick, Bartunek, & Dutton, 2000; Wrzesniewski, Dutton, & Debebe, 2003), creativity (Burt, 2004; Perry-Smith, 2006), and career mobility (Gersick et al., 2000). In addition, two recent meta-analyses showed that social support between coworkers was strongly related to organizational variables such as absenteeism, turnover intentions, job satisfaction, organizational commitment (Humphrey, Nahrgang, & Morgeson, 2007), effort reduction, and individual performance (Chiaburu & Harrison, 2008).

Work is intimately intertwined with social relationships (Grant & Parker, 2009), and individuals often define themselves in their workplaces vis-à-vis their relationships to others (Sluss & Ashforth, 2007). Organizational members constantly assess the extent to which their peers are valuable contributors, and to what extent they are deserving of credit for collective successes (Gómez, Kirkman, & Shapiro, 2000). Accordingly, the evaluations made of us by our peers can have profound effects on our careers through informal channels for personal success, including sharing vital information (Cerne, Nerstad, Dysvik, & Škerlavaj, 2013), spreading harmful or beneficial reputational information (Feinberg, Cheng, & Willer, 2012; Feinberg, Willer, Stellar, & Keltner, 2012), or directly helping in our efforts (Bowler & Brass, 2006).

Moreover, peer evaluation influences our success through formal channels, including direct peer evaluation in self-managed teams (Ilgen & Pulakos, 1999) or via 360 degree feedback systems which may be considered in formal appraisal and promotion decisions (Mount, Judge, Scullen, Sytema, & Hezlett, 1998). Indeed, a recent Wallstreet Journal article points out that peer performance reviews are becoming increasingly popular in organizations (Silverman & Kwoh, 2012). Organizations such as Oracle and Google now rely on employees to monitor and incentivize their coworkers via a peer bonus system, and services such as www.bonus.ly help organizations integrate peer bonuses into their cultures and operations. Social media websites (such as www.linkedin.com) allow individuals to endorse their peers, and such recommendations may create advantageous opportunities. Thus, organizational scholars should find great interest in uncovering relational characteristics which influence the evaluations we make of others in the workplace, as evaluations made by one's coworkers can increasingly impact career outcomes.

Surprisingly, however, dyadic interactions between coworkers are rarely tested in the organizational literature (for exceptions see Bakker & Xanthopoulou, 2009; Curhan & Pentland, 2007; Ferrin, Bligh, & Kohles, 2008; Yalovleva, Reilly, & Werko, 2010). Indeed, the way we feel in the presence of others is driven by both the traits of the interaction partner as well as the traits of the focal individual (Eisenkraft & Elfenbein, 2010), yet organizational researchers often make the error of considering the characteristics and traits of only one of the interacting peers (Duncan, Kanki, Mokros, & Fiske, 1984). We argue that reactions to the personalities of others vary as a function of the traits of the raters themselves. Specifically, we explore how the interpersonal traits (i.e., extraversion and agreeableness) of focal individuals (actors), and their

observing peers (peers)[1], interact to affect the evaluations that peers make of the contributions of actors, resulting in dyadic differences in evaluations of performance, peer bonuses and recommendations for opportunities given to the actor. Critically, we focus here on how introverts' differential sensitivity to the interpersonal traits of others influence how they form judgments of their team members, with consequences for how they subsequently rate and reward them. Regardless of whether the interpersonal traits that underlie such judgments eventually help or hinder collective performance or whether the judgments themselves are accurate, a systematic "rater by actor" effect in evaluations and rewards may have critical implications for the careers of those involved.

Drawing from the Realistic Accuracy Model (RAM) of personality judgment (Funder, 1995), we present an information-utilization model of interpersonal dyadic evaluation. We propose that complementary processes of trait sensitivity and general impression formation make introverted (but not extraverted) peers especially reactive to interpersonal personality traits (i.e., agreeableness and extraversion) of focal actors. Accordingly, introverts are likely to pay special attention to interpersonal traits, and also construct more negative general person impressions when interacting with disagreeable and extraverted individuals. In previewing our results, trait sensitivity and negative person impressions constructed by introverted peers lead to diminished evaluations of performance and distribution of rewards for disagreeable and extraverted actors.

In our first study, we use a field sample of in-tact and enduring teams to determine whether extraverted and disagreeable team members are evaluated more poorly by their introverted (but not extraverted) peers. In our second study, we use an experiment wherein actor personality was carefully manipulated and the task performance contributions of actors was held

[1] The terms actors and partners are commonly used in dyadic analysis to describe relationships between participants (see Kenny, Kashy, & Cook, 2006). However, because we discuss evaluations made by partners as the focal outcome, we use the term "observing peers" to facilitate clarity throughout.

constant to test mediating mechanisms of the proposed effect, and determine whether trait interactions (in the absence of differences in task performance) produce systematic deviations in evaluations and provisions of peer bonuses and promotion recommendations. The combined results of our two studies support a model demonstrating that introverts (but not extraverts) systematically evaluate their peers more negatively as a function of actor disagreeableness and extraversion, with potentially negative outcomes for the actor. As such, introverts may unknowingly serve a critical role as gatekeepers of outcomes in organizational settings.

INTERPERSONAL TRAITS: AN INTERACTIONIST APPROACH

Personality traits are important to individuals' functioning in the workplace because the cognitions, emotions, and behaviors reflected in personality are thought to contribute not only to task performance (see Barrick, Mount, & Judge, 2001) but also to how individuals react and relate to each other while performing work together (e.g., LePine, Buckman, Crawford, & Methot, 2011; LePine & Van Dyne, 2001). Two traits in particular have been demonstrated to be specifically relevant for social interactions: extraversion and agreeableness (McCrae & Costa, 1989; Wiggins & Trobst, 1999). These traits fit closely with the interpersonal circumplex dimensions of *dominant—submissive* and *agreeable—cold-hearted* (Wiggins & Trapnell, 1996). As McCrae and Costa (1989) note, "Extraversion and Agreeableness define the plane of interpersonal behavior," with the interpersonal circumplex being comprised of "the two-dimensional plane defined by Extraversion and Agreeableness" (McCrae & Costa, 1989: 590). Hence, extraversion and agreeableness are the traits we expect to be specifically relevant when assessing interpersonal personality influences on work outcomes.

Personality exists as both real underlying attributes/traits of individuals (Funder, 1995), as well as consistent behavioral acts which can be observed and utilized by others (Fleeson,

2001; Connelly & Ones, 2010). Accordingly, Funder's (1995) Realistic Accuracy Model (RAM) of personality judgment suggests that individuals attempt to accurately rate and utilize the traits of others in order to successfully anticipate their likely behavior (Funder, 1995). In order to evaluate the personality traits of another, the environment must allow the target to express the trait (Relevance); the encounter must allow for observation of trait expression (Availability); the observer must notice trait-relevant cues (Detection), and the observer has to appropriately assemble these cues to form an impression of the target (Utilization; Funder, 1995).

Critically, the priorities an individual places on detecting specific traits in others may vary (Funder, 1995). Because people evaluate the personalities of others for functionalist goals such as protecting themselves from interpersonal conflicts (Funder, 1995), we argue that introverts and extraverts will differentially both *detect* and *utilize* trait information gleaned from interactions with peers to evaluate their behavior. Indeed, individuals evaluate others with their own chronically activated schemas in mind (Markus, Smith, & Moreland, 1985). For example, in one study, less sociable (i.e., introverted) individuals demonstrated greater accuracy in identifying extraversion levels and other traits of those whom they had just met (Ambady, Hallahan, & Rosenthal, 1995). However, individuals may also utilize traits differently in making judgments about the target. Supportingly, Bargh, Bond, Lombardi and Tota (1986) found that participants who were shy (or kind) were more likely to interpret ambiguously shy (or kind) target behaviors in terms of that trait than other participants, suggesting that our interpretations of the traits of others are made with our own perspectives in mind.

Funder (1995) argued that trait utilization may be moderated by a *judge X information sensitivity interaction:* "Certain judges might prefer or be able to receive and use certain kinds of information but not other kinds…this tendency of certain judges to search for and perceive

certain information, or to weigh certain kinds of information more heavily in their judgments, is called *sensitivity"* (Funder, 1995: 664). Accordingly, we first argue that introverts (but not extraverts) are more likely to monitor behavior with particular concern for interpersonal traits. Second, we argue that introverts (but not extraverts) are more likely to utilize interpersonal traits in forming general impressions and then evaluate others through that lens.

Introversion as a trait-sensitivity amplifier

Prior work suggests two reasons why introversion should amplify sensitivity to interpersonal traits within interdependent settings. First, introversion is generally associated with reduced assertiveness (Bendersky & Shah, 2013; Lobel, 1981), and individuals lower in assertiveness generally prioritize relational outcomes such as reduced interpersonal conflict (i.e., Ames, 2008). Thus, introverts may actively monitor their potential teammates for signals that behaviors related to competition and conflict may be forthcoming. Accordingly, trait signals of extraversion (perceived as associated with poor listening and low receptivity; Grant, Gino, & Hoffman, 2011) and disagreeableness (associated with argumentativeness; Barrick et al., 2001) should be particularly useful to introverts.

Second, introverts display generally enhanced sensory processing sensitivity and responsiveness to stimuli (Stelmack, 1990). Studies have shown that introverts are more sensitive to loud noises, temperature extremes, bright sunrays, and to irritating stimuli (Aron & Aron, 1997). Indeed, introverts exhibit significantly greater overall sensory-processing sensitivity than extraverts (Aron & Aron, 1997), indicating that they pay more attention than extraverts to even slight stimuli. Thus, the tendency of introverts to be stimulated by their environment should also make them more reactive to the effects of other people's interpersonal traits.

Introverted peers are more sensitive to actor (dis)agreeableness.

Because most social situations are somewhat ambiguous (Bruner, 1958), many disagreeable behaviors may be interpreted as benign. However, we argue that introverts may be more generally sensitive to the agreeableness of potential interaction partners for two reasons. First, agreeableness signals the likelihood of cooperation and reciprocity (Ames & Bianchi, 2008). Although trait (dis)agreeableness has multiple facets, individuals low in agreeableness are "more argumentative, inflexible, [and] uncooperative," and these tendencies are likely to have negative effects on peers (Barrick et al., 2001). Indeed, the conflict oriented behaviors of disagreeable actors should elicit strong reactions from others, because the need to protect oneself from potential social harm is a fundamental human motive (Kenrick, Li, & Butner, 2003). Because introverted peers are generally lower in assertiveness than their extroverted counterparts (Bendersky & Shaw, 2013; Lobel, 1981), introverted peers are likely to view disagreeable actors as particularly problematic, as introverts are less likely to engage in assertive and corrective behaviors when arguments occur (Lobel, 1981).

Second, the disagreeable behaviors of actors may be more rapidly detected by introverts than by extraverts simply because such behaviors may create obstacles to the outcomes which introverts favor: relational outcomes (Bendersky & Shah, 2013). By contrast, extraverts often prioritize instrumental outcomes, and thus may simply find (dis)agreeableness less diagnostic.

Introverted peers are more sensitive to actor extraversion.

Prior research has demonstrated that less sociable (i.e., introverted) individuals are more capable of discerning extraversion in zero acquaintance encounters (Ambady et al., 1995). We suggest that introverted peers are more sensitive to extraversion because they recognize that highly assertive (i.e., extraverted) actors often compromise relational outcomes in the interest of

instrumental ones (Ames & Flynn, 2007), and because extraverts are often afforded initial high status in the absence of relevant performance information (Bendersky & Shah, 2013).

First, while extraversion is associated with sociability, it is also defined by social dominance. Bono, Boles, Judge and Lauver (2002) found that the average level of extraversion in roommate pairs was associated with increased relationship conflict. Further, extraverts frequently sacrifice interpersonal harmony for the sake of instrumentality (Ames, 2008). While most people naturally resist domination by others (Driskell, Olmstead, & Salas, 1993; Ridgeway, 1987), dominant behavior may sometimes be difficult to detect (Gottman & Ringland, 1981; Dunbar & Burgoon, 2005), suggesting that individuals will expend effort to detect it only to the extent to which it is useful for them to do so. Introverts, who care about relational outcomes, should therefore be more sensitive to these traits. Second, researchers have argued that because of increased assertiveness, extraverts are often afforded high status within newly formed groups (Bendersky & Shah, 2013), and that such status conferrals might come at the expense of their peers who don't display these traits (i.e., introverts). We suggest that introverts may be aware of the fact that high status conferrals afforded to extraverts may come at their own expense. Thus, introverts should be motivated to rapidly detect trait extraversion in their coworkers.

Additionally, extraverted behaviors may be viewed critically by introverted peers because extraversion signals possible conflict. Extraversion has been conceptualized as the tendency to exhibit high levels of intense emotions and energy (Watson & Clark, 1997). Extraverts are particularly good at expressing and transmitting intense emotions (Hatfield, Cacioppo, & Rapson, 1994), such as anger. In turn, their conflict orientation makes extraverts exhibit behaviors that may be perceived as highly aversive. Therefore, for similar reasons that introverts would be sensitive to disagreeableness, they should also be sensitive to signals of extraversion.

By contrast, extraverted peers find interpersonal competition less threatening than their introverted counterparts (Schneer & Chanin, 1987), and highly assertive (i.e., extraverted) peers generally over-emphasize instrumental outcomes within work teams (Ames & Flynn, 2007). Thus, extraverts are less likely to find traits related to extraversion especially diagnostic.

Introversion as a filter of trait information utilization in forming person impressions

We suggest that introverts will not only differentially attend to interpersonal traits, but that they will also utilize interpersonal traits in constructing overall impressions. Humans tend to judge others' behaviors based on the general person impression they have formed of them (Srull & Wyer, 1989). By *person impressions*, we refer to the top-down mental representation of what a person is like in general (including both trait-based expectations and likeability), constructed for use in future interactions and judgments (Srull & Wyer, 1989). A given behavior, then, may be interpreted in several different ways (cf. Bruner, 1957) depending on the favorability evaluations formed about the person. For example, a person's comment may be interpreted to be brilliant, eccentric, or socially awkward based on the general impression formed in the first few minutes of interacting with him (Pfeffer, 2010). As such, general person impressions may have a profound effect on how people interpret the behaviors of others. Indeed, when a person is described by a set of adjectives, evaluations of the positivity of any descriptor increase with the positivity of those that accompany it (Anderson & Lampel, 1965; Kaplan, 1975; Wyer, 1974).

This effect is also known as the halo effect (Nisbett & Wilson, 1977) which suggests that known attributes of a person influence the way individuals perceive unknown attributes that are unrelated to the behaviors that informed the general impression. Thus, if an individual has formed the general impression of another as being disagreeable, this perception may cast a halo on other aspects of the other person's personality (e.g., her honesty; Higgins, Rholes, & Jones,

1977; Srull & Wyer, 1979; 1980). When people observe another's behaviors, they attempt to interpret each behavior in terms of more general trait concepts that come to mind at the time of evaluation, eventually aggregating to a general evaluative impression (Srull & Wyer 1989). Once they form such a general impression of a person, they interpret this person's subsequent behaviors according to this *overall* evaluative concept (i.e., likeability) and not the specific behavior or trait-level impressions (i.e., extravert) (Srull & Wyer, 1989).

Introverted peers are more likely to utilize actor (dis)agreeableness to form impressions

According to Funder's (1995) model, trait utilization in impression formation depends in part on the judge, who may differentially incorporate certain traits. Thus, while agreeableness provides information to interaction partners about one's ability to interact smoothly with others (Barrick et al., 2001), agreeableness may not be equally useful to everyone. Indeed, Ames and Bianchi (2008) found that individuals differentially attended to agreeableness of a potential interaction partner, as a function of their own likely positional power in the interaction. Specifically, those evaluating from the perspective of a potential subordinate included judgments of agreeableness in their assessments; by contrast, those evaluating from a position of power largely excluded judgments of agreeableness from their assessments (Ames & Bianchi, 2008).

Because introverted individuals are typically quieter and more reserved in their social interactions (Gosling, John, Craik, & Robins, 1998) and are less assertive (Bendersky & Shah, 2013) they are generally placed in positions of relatively low social power compared to their extraverted counterparts (Grant, Gino, & Hofmann, 2011). In turn, individuals low in social power are likely to vigilantly monitor for signs that higher power individuals may cause them harm (Galinksy, Magee, Inesi, & Gruenfeld, 2006). Furthermore, because of introverts' desire to avoid arguments and aggressive interactions (Blickle, 1997), they may place a premium on

utilizing trait agreeableness when judging others. By contrast, because extraverts enjoy the benefits of dominance and social power in their dyadic interactions (Grant et al., 2011), and because they focus more on instrumental outcomes (Ames & Flynn, 2007), agreeableness may be less useful for extraverted peers in forming a judgment about the actor.

Introverted peers are more likely to utilize actor extraversion to form impressions

Similarly, we suggest there is differentially useful information for introverts to be found in the trait extraversion of others. Although there are qualities of extraverts that draw others toward them (e.g., friendliness, sociability), extraverts may also be described as domineering, bossy, aggressive, unrestrained, outspoken, and forceful (Costa & McCrae, 1992; Trapnell & Wiggins, 1990). Extraversion has been related to a preference for both dominance and competition as conflict resolution strategies (Schneer & Chanin, 1987) and the tendency to be argumentative (Blickle, 1997). Because introverts are apprehensive about initiating communication within groups (Opt & Loffredo, 2000) and generally adopt a less confrontational interaction style (Blickle, 1997), trait extraversion in others should be perceived as potentially threatening, and hence especially relevant in forming judgments of others.

By contrast, while extraverted peers may detect the extraversion of others, they might be less likely to utilize it in constructing their evaluations of others. Although extraverted peers may recognize the potential for conflict with extraverted actors, their preference for dominance and competition attenuates the perceived threat of other extraverts (Schneer & Chanin, 1987). Additionally, because those operating from positions of high social power (i.e., extraverts) are more concerned with performance-relevant traits in constructing their judgments of others (Ames & Bianchi, 2008), extraverted individuals should be less likely to utilize trait extraversion in forming performance evaluations.

Performance evaluation and rewards giving

As work is increasingly completed through collaboration (Ilgen & Pulakos, 1999), organizations have increasingly relied upon peer evaluations and peer rewards to maintain effective work relationships. Because introverts are more likely to attend to interpersonal traits, we reason that they will likely attend to the negative interpersonal behavior of disagreeable and extraverted actors when evaluating performance. In this sense, the sensitivity of introverts to others' traits should contribute to how they evaluate the performance of others.

Because appraisal ratings are necessarily made in the absence of complete information and certainty of memory (Wherry & Bartlett, 1982; Martell & Leavitt, 2002), biases in observation (i.e., what behaviors are attended to) and biases in recall (i.e., which behaviors are filtered and utilized in evaluation) can have dramatic effects on performance ratings (Wherry & Bartlett, 1982). Accordingly, less performance-relevant information (e.g., race; past performance history) can have an effect on the way we evaluate others' performance (Hekman, Aquino, Owens, Mitchell, Schilpzand, & Leavitt, 2010; Martell & Leavitt, 2002). Thus, because introverts are more likely to detect and utilize interpersonal traits in their judgments, they should be more likely to include such information in their appraisals and in granting rewards.

Whether or not the impressions introverts form and in turn influence their performance evaluations of others can be interpreted as more comprehensive (i.e., considering traits which may ultimately disrupt others in the group) or simply more biased, we expect that the trait sensitivity of introverts (but not extraverts) and the negative person impressions of disagreeable and extraverted individuals constructed by introverted (but not extroverted) peers should negatively affect evaluations of performance. Indeed, individuals generally face some degree of uncertainty when rating and rely upon person impressions to "fill-in the gaps" (Wherry &

Bartlett, 1982), and may also reweight performance criteria to justify decisions reflecting their own social preferences or biases (Uhlmann & Cohen, 2005). Because the person impressions made by introverted peers will be focused heavily on aspects of relational behavior, we expect the (negative) judgments made of disagreeable and extraverted actors by introverted peers to downwardly influence their performance evaluations. We also expect peers' sensitivity to the actors' traits and peers' general impressions of the actors to mediate these relationships (i.e., first stage mediation, Edwards & Lambert, 2007).

Further, rewards and advancement opportunities are not necessarily strongly related to performance (Dohmen, 2004; Carmeli, Shalom, & Weisberg, 2007; Pfeffer, 2010; Zenger, 1992). However, there is ample evidence to suggest that both traits (Judge, Higgins, Thoresen, & Barrick, 1999; Seibert, Crant, & Kraimer, 1999) and person impressions (Flynn, Chatman, & Spataro, 2001) can effect career outcomes. Thus, we expect the interactions between peer trait (introversion) and actor traits (disagreeableness and extraversion) to also affect the rewards and recommendations for advancement given to the actor. Moreover, given that we expect trait interactions to influence the trait sensitivity and impressions that are formed, we in turn also expect trait sensitivity and person impressions to mediate the relationship between trait interactions and rewards. Thus, we hypothesize that peer observer by actor trait interactions will influence both peer observers' performance evaluations made about the focal actor, as well as the rewards they give the actor in the following ways:

> *Hypothesis 1a: There will be an interaction between observing peers' extraversion and actors' extraversion in predicting observing peers' performance evaluations of and rewards given to actors. Specifically, performance evaluations and reward-allotments made by introverts to their extraverted counterparts will be more negative than those made by extraverted peers.*
>
> *Hypothesis 1b: There will be an interaction between observing peers' extraversion and actors' agreeableness in predicting observing peers' performance evaluations of and*

rewards given to actors. Specifically, performance evaluations and reward allotments made by introverts to their disagreeable counterparts will be more negative than those made by extraverted peers.

Hypothesis 2a: Trait-sensitivity mediates the interaction between observing peers' extraversion and actors' extraversion on performance evaluations of and reward given to the actor.

Hypothesis 2b: Trait-sensitivity mediates the interaction between observing peers' extraversion and actors' agreeableness on performance evaluations of and rewards given to the actor.

Hypothesis 3a: Person impressions made of actors mediate the interaction between observing peers' extraversion and actors' extraversion on performance evaluations of and reward given to the actor.

Hypothesis 3b: Person impressions made of actors mediate the interaction between observing peers' extraversion and actors' agreeableness on performance evaluations of and rewards given to the actor.

STUDY 1

Participants and Procedure

Graduate students enrolled in five sections of a required Management course at a large Southeastern university voluntarily participated in a study on "team effectiveness" in exchange for extra credit. Ninety-seven of the 178 participants were working professional or executive MBA students and the rest were traditional MBA or Master in Management students. Average age was 29.5; average work experience was 8.23 years (SD = 5.79), and 73% were male. Students were assigned to four or five-person teams by the MBA office at the beginning of their program. The study was introduced around the midpoint of the semester and consisted of completing an online questionnaire about team members, team processes, and the focal participant's personality. One hundred ninety one students of 207 elected to participate (92%). Due to missing data, responses from 178 participants were included in the analyses.

Measures

Performance evaluations. Each team member rated his or her 3-4 team members on 13 items taken from the Role Based Performance Scale (RBPS, Welbourne, Johnson, & Erez, 1998). The RBPS consists of five dimensions of performance of which four (task, creative, team, and citizenship) were used. The dimension of career was excluded as it was deemed irrelevant in this context, as were two items from the other dimensions (e.g., customer service). The RBPS has been validated extensively in multiple settings (Welbourne et al. 1998). Participants rated their team members on a scale ranging from *1 = need much improvement* to *5 = excellent*. Example items include: "Quantity of work output (task)," "Coming up with new ideas (creative)," and "Doing things that help others (citizenship)." The coefficient alpha reliability estimate for this scale was .95.

Agreeableness. Agreeableness was measured with the Mini-Markers agreeableness scale developed by Saucier (1994). The 10-item scale asked participants to describe themselves by responding to adjectives such as "sympathetic," "warm," "cooperative," and "harsh (reverse item)" on a five-point response scale (1 = *very inaccurate* to 5 = *very accurate*). Coefficient alpha for this measure was .84.

Extraversion. Extraversion was measured with the Mini-Markers extraversion scale (Saucier, 1994). The 10-item scale asked participants to describe themselves using adjectives such as "extraverted," "talkative," "assertive," and "shy (reverse item)"on a five-point rating scale (1 = *very inaccurate* to 5 = *very accurate*). The coefficient alpha for this measure was .91.

STUDY 1 RESULTS

Means, standard deviations, and intercorrelations of all variables appear in Table 1. We employed a social relations model dyadic (i.e., round-robin) design in which each person rated

all other team members (Kenny et al., 2006). As a preliminary analysis we partitioned the variance of performance evaluation into variance-components using Kenny's (1995) SOREMO program for the round-robin data structure. Variance partitions for performance evaluation suggested that judgments of performance are mainly dependent on interactive relationship effects. Variance due to actor effect (13%, $p < .05$) indicates that only a small portion of the performance ratings were due to attributes of the actor. Twenty six percent ($p < .05$) of the performance evaluation variance was due to peer effects; and 36%[2] was accounted for by the relationships or the dyadic interaction between actors and peers.

In order to test the influence of the personalities of peers and actors on peer evaluations of the actor's performance we used a dyadic method for Hierarchical Linear Modeling (HLM 6.08, Raudenbush, Bryk, & Congdon, 2009) developed by Campbell and Kashy (2002). This method accounts for the interdependence of the dyads by modeling how the peer and actor independent variables affect the peer outcomes. In this method each dyad is treated as a group of two individuals. At level 1 each dyad has two rows, and in each row the rated performance of a dyad member (as given by the other member) is regressed on the mixed predictor variables of peer and actor personality as well as personality interactions of the actor and the peer. For example, in a dyad consisting of peers A and B, the first row regresses A's performance (as given by B) on A's extraversion, B's extraversion, and the interaction between A's and B's extraversion. In turn, the second row regresses B's performance (as given by A) on B's extraversion, A's extraversion, and the interaction between B's and A's extraversion. Accordingly, at level 1 we regressed the performance rating on the extraversion and agreeableness of both the actor and the observing peer and the interaction between the peer's

[2] We conducted another analysis using the four facets of performance in the Welbourne et al. (1998) scale to calculate the error variance (25%).

extraversion and actor's extraversion and agreeableness. At level 2 a null model was specified where each β coefficient from the first level was the dependent variable and, except for the intercept that had an error term, ($\beta_{0j} = \gamma_{00} + U_{0j}$) all other coefficients were tested as fixed-effects without error terms (i.e., $\beta_1 = \gamma_{10}$).[3]

The results of the HLM analysis for all three data sets are reported in Table 2, and show that both agreeableness and extraversion of actors interacted with extraversion of peers to influence evaluations of actors' performance in all three sub-samples. A graph of the interaction between peers' and actors' extraversion in sub-sample 1 is shown in Figure 1. The figure shows that introverted peers clearly rate the performance of introverted actors higher than the performance of extraverted actors, with no difference of rated performance related to the trait of extraversion by extraverted peers. Simple slopes analysis for HLM (Preacher, Curran, & Bauer, 2006), represented in Table 2 shows that all three sub-sample slopes for introverted peers were significant while the slopes for extraverted peers were not. Thus, Hypothesis 1a is supported.

A graph of the interaction between peer extraversion and actor agreeableness in sub-sample 1 is shown in Figure 2. The figure shows that extraverted peers are not significantly influenced by the agreeableness of actors. In contrast, introverted peers rate the performance of disagreeable actors as lower than that of agreeable actors. Simple slopes analysis in sub-sample 1 (Table 2) shows that the slope for introverted peers was significant while the slope for extraverts was not significant. The same trends in the data were present in sub-samples 2 and 3; however,

[3] Because these analyses only account for independent dyads in a data set and the round-robin design employed in this study had non-independent dyads (i.e., A is a peer of B, C, and D) we divided the data set into three separate sub-samples (80 - 83 dyads) in which each dyad only appeared once (i.e., A with B and C with D). These data sets are not completely independent because they consist of the same participants. However, the dyads in these data sets are independent. Because our sample also contained groups of five individuals there were actually three more independent-pair data sets that could potentially be created and analyzed. However, the sample size of these additional data sets ranged in size from 9 to 19 and given methodological conventions pertaining to small samples they were deemed too small to be analyzed.

here the slopes for introverted peers, as well as, the slopes for extraverted peers were also significant. These results suggest that all peers may prefer agreeable actors; however, the presence of an interaction effect and steeper simple slopes suggest that introverts are more reactive to the agreeableness of actors. Thus, H1b is supported.

STUDY 2

Sample and Procedure

Students enrolled in a management course at a large Southeastern university were asked to participate in a study aimed at investigating virtual work teams. Participation was on a voluntary basis and was rewarded with extra credit. One hundred forty three students participated with age ranging from 19 to 46 years old and a median age of 20. Fifty seven percent were female and 66.9% identified themselves as White, 4.9% African American, 19% Hispanic, 5.6% Asian, and 3.5% listed their race as 'other'. Participants were told that the study would consist of two separate parts: first, they would answer questions about their own personality via an on-line survey; secondly, they would be contacted and assigned to a four-member on-line team task about one week later.

In the first phase of the study participants completed a personality questionnaire and wrote a brief paragraph describing their own personality. About a week later participants were contacted via e-mail and were provided a link to the second part of the study. Once consent for participation was secured, participants were guided through (and confirmed) basic system requirements for the study, including enabled computer speakers or a headset, a functioning microphone, and sufficient uninterrupted time to take part in the study. Participants then selected an avatar (the image of one of four Monopoly pieces), and entered a username to represent them in the game.

Participants were then provided with a personality profile of each of their assigned on-line teammates. These profiles included the players' usernames, chosen avatars, self-description personality paragraphs that were obtained a week earlier, and "unique personality profiles generated by the computer from their completed personality questionnaire that was answered a week earlier." Importantly, when participants viewed their own profiles, they were provided with scripted feedback on their own personality that was designed to be especially vague (i.e., neutral about actual traits) and which could be applied to virtually anyone (i.e., "You tend to live in the here and now but your work productivity is dependent on your mood"). Participants were instructed to pay close attention to the personality characteristics of the other three team members.

In the next phase, participants entered the "Synergize!" game with their on-line teammates (see Figure 3). The goal of the game was to generate, as a team, as many highly creative uses for a brick as possible within a ten-minute time limit. During a turn, a specific player who was "holding the ball" was to enter a unique creative use for a brick. After his/her turn, this player clicked on another player's avatar to pass this team member an "electronic ball" (and it would consequently be that player's turn). Players were also given two options to interact with their on-line teammates. During their turn, entering the word 'chat' as their answer enabled a dialog box, in which players could send a text message to all of their team members. After the message was displayed, a textbox indicating it now was the player's turn to enter a creative use for brick appeared. Alternatively, players could enter the word 'talk', and use their computer or headset microphone to send a real-time voice message to all of their teammates. Each time a player entered an answer and passed the ball on to another team member, the on-screen score

was increased by one point. The score was unaffected by 'chat' and 'talk' options, and the game ended after 10 minutes.

Finally, in the last phase, participants answered questions about their teammates. Specifically, participants were told that, in the interest of time, each player would be asked to rate only one other teammate. Upon completion of all four phases, participants were thanked for their participation and debriefed.

Experimental Manipulations

Except for the participant, all players in the Synergize! game were electronic confederates, designed to appear to be real participants[4]. The uses for a brick, spoken 'talk' comments, and written 'chat' comments were pre-scripted by the experimenters and provided during the game in a sequence that resembled real play and spontaneous commentary. All electronic confederates used colloquialisms, occasional misspellings or abbreviations, and sometimes humorous answers to increase believability. In some communications, the electronic confederates mentioned the actual player's username or answers (e.g., "good job, ___!", or "___ isn't very good at this") to further facilitate believability. Response lags varied within-player to simulate thinking time delays. All electronic confederates passed the ball at random to the other players, indicating a realistic pattern of play. While confederates' creative uses for a brick, response times and number of comments were kept constant across conditions (holding objective performance constant), the content of 'chat' comments, 'talk' statements, and personality profiles of the target virtual confederate were varied to reflect the personality manipulation.

Personality profiles of the confederates were manipulated in three ways: (a) the paragraph description that participants "wrote" describing themselves (see Amabile, 1983 for a similar

[4] For example, a screen at the beginning of the study indicated how many other players were logging-on to the system, and "thinking time" delays by the electronic confederates (based on real pilot players) varied probabilistically across turns.

manipulation), (b) the "computer generated" profile based on the personality questionnaire participants "answered," [5] and (c) the "chat" and "talk" comments during the game. Participants were randomly assigned to one of four conditions in a between-subjects-design. In all four conditions two of the three electronic confederates provided the same personality paragraphs across conditions, with the self-describing paragraphs (i.e., "I rely a lot on my intuition and I am very spontaneous," and computer generated personality profiles (i.e., Efficient, Responsible, Emotional. You are thorough and can be relied on to get the work done but sometimes you can be touchy) specifically designed to describe vague or personality-imprecise characteristics and avoid signaling clues to extraversion or agreeableness.

We manipulated the personality profile of the third (target actor) confederate according to each condition, to describe an individual who was either highly: agreeable; disagreeable; extraverted; or introverted. For example, a self-descriptor of the agreeable target confederate consisted of statements such as "I hate confrontations and I prefer to collaborate with other people rather than argue with them." The computer generated statement for the agreeable target was "Pleasant, Cooperative, Helpful. People tend to get along with you and trust you." For a disagreeable target we used statements such as "I am not really interested in other people's problems. I hate it when people are making excuses and I let people know when they are lazy or incompetent." The computer generated profile for the disagreeable target was "Abrupt, Sarcastic, Impatient. You are quick to judge others and you tend to frequently lose your temper." Similarly, a self-descriptor of an extraverted target consisted of statements such as "I am an outgoing person, I enjoy social activities and hanging out with lots of people" and "I really like

[5] We conducted an additional study with two groups of participants ($N_{agreableness}$=17, $N_{disagreeableness}$= 22) in which we omitted the computer generated profile from the manipulations of agreeableness/disagreeableness. The results were identical to the results obtained with the computer profile included. Thus, in the reported results we retained this part of the manipulation.

to take charge and influence the way things get done." The computer generated profile for the extraverted target was "Friendly, Sociable, Dominant, Assertive. You think highly of yourself and you would be a fierce opponent. You are someone to keep as a friend and avoid as an enemy." For the introverted target we used statements including "In general I am a quiet person and do not like to draw attention to myself. " The computer generated profile for the introverted confederate was "Shy, Quiet, Laid-back. You tend to keep in the background but you could be a very good second in command." [6]

During the game, all three virtual confederates used the 'chat' option, and two of the confederates (including the target actor) used the 'talk' option. The manipulated confederate (actor) made both spoken and written comments meant to support the personality profile manipulation, which were designed to reflect behavioral manifestations of the corresponding personality trait. For example, the extraverted version of the confederate exclaimed "I wish I could meet and talk to you all personally!" but also "Hey _____, C'mon buddy, let's go!" and "_____, you need to come up with better ideas, pal." In contrast, the introverted confederate stated "It is kind of strange playing with total strangers," and "I prefer not to say much… so please don't think I am being standoff-ish." An agreeable confederate used comments such as "Guys these are some great ideas you are coming up with" and "nice pass _____", while the disagreeable confederate commented "Would you pass the ball to me already?" and "C'mon _____…while we are young."

The 'talk' responses for the manipulated conditions were recorded using the same voice actor across conditions. The neutral 'talk' responses of one of the neutral confederates (added to increase believability) were recorded by a second voice actor, and the messages were held constant across conditions. The 'chat' and 'talk' responses occurred probabilistically across

[6] The confederate self-descriptions and Inquisit syntax for "Synergize!" may be requested from the third author.

games, such that participants heard between three and five, and on average four 'talk' or 'chat' turns from the manipulated confederate, and between two and four from the neutral confederates, during the game. On average, roughly half of the turns taken by the manipulated confederate were without 'chat' or 'talk' commentary. Critically, the uses for a brick provided by the manipulated confederate and response times did not vary across conditions, to hold objective performance constant across conditions. That is, regardless of condition, the manipulated confederate was equally effective at contributing to the team's task performance. In the final phase of the study, real participants were told that they would be randomly assigned to answer questions about a single team member. Although the computer presented a short delay with a message stating that it was "randomly choosing team member", all participants were assigned to answer questions about the manipulated confederate.

Because of the possibility that participants might realize that the electronic confederates were not real people, a naivety check was incorporated into the study design. After the task, participants were told the plausible story that because all the participants came from the same large management class there is a possibility that they had guessed whom the other team members were, and this knowledge may affect the results of the study. They were then asked an open-response question of "do you think you might know whom any of these other players are?" Indicating that they don't know who the team members are or writing names would suggest that participants believed the other confederate players were real individuals (i.e., by not answering "they're virtual people", "they're not real", or "they're part of the study"). Data from participants who suggested "virtual people", "they're bots" or other statements indicating their suspicions of our use of confederates in this study in response to the naivety check (eight participants in total) were discarded.

Measures

Performance evaluations. Performance evaluation of the confederate was rated by participants using the RBPS (Welbourne et al., 1998) scale ($\alpha = 0.96$).

Promotion recommendations. Promotion recommendations were measured with six items adopted from Kiker and Motowidlo (1999). Participants were asked to imagine that they are managers and that their team members are their employees. They then had to make several promotion recommendation decisions about the manipulated confederate on a 7-point anchored scales (e.g., promotion suitability rated on 1 = totally unsuitable to 7 = extremely suitable anchored scale), whether to promote the confederate, and whether to recommend him/her for a fast-track development program ($\alpha = .96$).

Peer reward decisions. To measure whether participants were willing to reward the manipulated confederate they were told that as a token of appreciation for students' participation in our study, and to the extent that we could afford with our limited budget for this study, we bought a number of gift cards from AMAZON worth $5 each and that we intend to offer these to the participants. However, participants were told that because of the limited number of gift certificates we could not give each and every participant a gift card, but instead we would rely on team member recommendation for the decision of who should receive the gift. The decision rule was that for a participant to receive the gift certificate, it would require at least the recommendation by two team members. Participants were then asked to indicate which two of their three team members should receive the gift certificate. If the manipulated confederate received the gift certificate from the participant it was recorded as '1' otherwise it was recorded as '0.'

Person impressions. Person impressions were measured with 20 items from Anderson's

(1968) likability adjectives list. Anderson investigated a list of 555 traits that people may attribute to others, ranked by their positivity. Of this list we chose the first 20 items representing the most positive impressions people have about others, and are unrelated to agreeableness and extraversion. We reasoned that constructed impressions of positivity/negativity based upon inferred traits best represent the conceptualization of general "person impressions" by Srull and Wyer (1989). Participants indicated whether adjectives such as "sincere," "honest," "trustworthy," and "intelligent," described the manipulated confederate on a 1 = *Very inaccurate* to 5 = *Very accurate* scale ($\alpha = 0.92$).

Trait sensitivity. Strictly speaking there is no objective score of the confederate "extraversion" or "agreeableness" to which we could compare the sensitivity of introverted and extraverted participants to the confederate traits. However, the manipulation of the confederate traits were rather strong involving self-description, "computer generated profile," and behaviors. Thus, the confederate could be perceived as a "prototypical" example of an extravert or an agreeable person. Accordingly, the higher score a participant gave to the confederate on measures of extraversion and agreeableness the more "sensitive" they could be perceived to be to this trait. We measured participants' sensitivity to the confederate's extraversion by asking the participant to indicate whether the 12 adjectives of the Saucier (1994) scale described the manipulated confederate on a 1 = *Very inaccurate* to 5 = *Very accurate* scale. Example items included "talkative," "assertive," "verbal," "energetic," and "shy" (reversed). Coefficient alpha reliability estimate was $\alpha = 0.96$. Similarly, we measured participants' sensitivity to the confederate's agreeableness by asking the participant to indicate whether the 12 adjectives of the Saucier (1994) scale described the manipulated confederate on a 1 = *Very inaccurate* to 5 = *Very*

accurate scale. Example items included "kind," "cooperative," "warm," "pleasant," and "harsh" (reversed). Coefficient alpha reliability estimate was $\alpha = 0.97$.

Peer's extraversion. Extraversion of the actual participants was measured with John and Srivastava's (1999) big five personality scale ($\alpha = 0.91$). The 8 item scale asked participants to respond to statements such as "I am outgoing and sociable" on a five-point response scale (1 = *strongly disagree* to 5 = *strongly agree*).

STUDY 2 RESULTS

Table 3 presents means, standard deviations, and inter-correlations of study variables.

Extraversion Condition

Manipulation checks. We conducted a one-way analysis of variance (ANOVA) with manipulated confederate extraversion as the independent variable on the dependent variable of a brief manipulation check scale using three items from the Big Five Inventory (BFI) of John, Donahue, and Kentle (1991). Participants indicated on a scale ranging from 1=*Strongly Disagree* to 7=*Strongly Agree* whether the confederate was "talkative," "assertive," "shy or inhibited" (reversed). The coefficient alpha reliability estimate was $\alpha = 0.82$. Results indicated that manipulated extraversion significantly influenced participants' ratings ($M_{\text{introvert}} = 2.48$, $SD_{\text{introvert}} = 1.15$; $M_{\text{extravert}} = 4.51$, $SD_{\text{extravert}} = 1.43$; $F(1, 65) = 39.20$, $p < .01$). Thus, results confirmed the manipulation validity.

Interaction of peer extraversion and actor extraversion on performance evaluations, promotions, and reward giving. To test the hypothesis that actor (confederate) extraversion interacted with peer (participant) extraversion to influence performance evaluations of and

promotion recommendations given to the confederate, we conducted a two-way MANOVA[7] with performance evaluations and promotion recommendations as the dependent variables with factors of the manipulated confederate's extraversion and the participant's extraversion (split at the mean). Results suggested that the main effect of participant extraversion was not significant, Multivariate $F(2, 61) = .61$, *ns*, but that the main effect of manipulated virtual confederate extraversion was significant, Multivariate $F(2, 61) = 3.86$, $p < .05$, $\eta^2 = .11$. However, this main effect was qualified by a significant interaction, Multivariate $F(2, 60) = 4.68$, $p < .05$, $\eta^2 = .13$.

ANOVA results showed a significant interaction effect ($F(1, 61)= 7.21$, $p < .01$) such that introverted participants evaluated the performance of introverted confederates ($M_{introverted} = 3.48$, $SD_{introverted} = .77$) as higher ($F(1, 28) = 12.41$, $p < .01$) than the performance of extraverted confederates ($M_{extraverted} = 2.36$, $SD_{extraverted} = .95$), while the extraversion level of the confederate did not make a difference to extraverted participants ($M_{introverted}= 2.92$, $SD_{introverted}= .81$; $M_{extraverted}= 2.98$, $SD_{extraverted}=.56$; $F(1, 34) = .05$, *ns*) (importantly, objective performance of the confederate was held constant across conditions). Similar results were found for promotion recommendations given about the confederate. ANOVA results showed a significant interaction effect ($F(1, 61)= 5.63$, $p < .05$) such that introverted participants gave more positive promotion recommendations ($F(1, 38) = 44.98$, $p < .01$) to the introverted confederate ($M_{introverted}= 4.40$, $SD_{introverted} = 1.40$) than to the extraverted confederate ($M_{extraverted} = 2.53$, $SD_{extraverted} = 1.38$); the extraversion level of the confederate did not influence extraverted participants' promotion recommendations ($M_{introverted}= 3.20$, $SD_{introverted}=1.35$; $M_{extraverted}= 3.28$, $SD_{extraverted}=1.37$; $F(1, 34) = .03$, *ns*). We note that a lack of difference in ratings made by extraverted peers rules out the

[7] All the AVOVA results in this section were conducted with Type II sums of squares which are recommended for unbalanced data (Langsrud, 2003).

alternative explanations of homophily (preference for those that share the same trait level) and complementarity (preference for those with the opposite trait level).

With regard to rewarding the confederate the results of a logistic regression showed that the effect of participant extraversion was not significant (B = -.50, *ns*) and neither was the effect of manipulated virtual confederate extraversion (B = -.86, *ns*). However, the effect of the interaction was significant (B = .55, p < .05). An odds-ratio of 5.78 (B = 1.75, $p < .05$) suggests that introverts were almost six times as likely to reward the introverted confederate in comparison to the extraverted confederate. In contrast, extraverts were not different in their rewards patterns of extraverts and introverts (B = -.55, *ns*, Odd-ratio = .58). Thus, H1a (extraversion) is supported[8].

***Mediated moderation effects of person impressions and rating of extraversion*.** To test for mediation effects we conducted two mediated moderation regression analyses for each dependent variable, using a bootstrap approach with 3,000 iterations (see Preacher, Rucker, & Hayes, 2007). Table 4 shows that when the mediating variables were included in a regression with performance evaluations, promotions, and rewards as the dependent variables the coefficients of person impressions were significant. Conditional indirect effects between actor extraversion and performance evaluations through person impressions showed a significant indirect effect ($b = -.44, p < .05$) for introverted participants. Similarly, conditional indirect effects between confederate extraversion and promotion recommendations and peer reward decisions through person impressions also showed significant indirect effects ($b_{promotions} = -.50, p$

[8] An alternative explanation to the results described in this section is that they all simply represent liking of the confederate. To address this alternative option we ran a series of regressions in which each dependent variable was regressed on peer's extraversion, the manipulated extraversion, and the interaction term. In each regression we also controlled for liking of the confederate which was measured using the Allen and Rush's (1998) adapted version of the Wayne and Ferris (1990) liking measure ($\alpha = 0.95$). The results showed that adding liking as a control did not significantly change any of the results.

$< .05$; $b_{reward} = -.26$, $p < .05$) for introverted participants. In contrast, the indirect effect through person impressions for extraverted participants was not significant for any of the dependent variables. Thus, hypothesis 3a was supported. Trait sensitivity was only a significant mediator of promotion recommendations but not of performance evaluation or reward decisions. The conditional indirect effects between confederate extraversion and promotion recommendations through trait sensitivity showed a significant indirect effect ($b = -.74$, $p < .05$) for introverted participants but not for extraverted participants. Thus, hypothesis 2a was partially supported.

Agreeableness Condition

Manipulation checks. To determine whether our experimental manipulations created the intended conditions for the study, we conducted a one-way analysis of variance (ANOVA) with the experimental manipulation of confederate agreeableness as the independent variable. Participants indicated on three items from John et al.'s (1991) BFI scale ranging from 1 = *Strongly Disagree* to 7 = *Strongly Agree* whether the confederate "liked to cooperate," "was helpful and unselfish with others," "starts quarrels with others" (reversed). The coefficient alpha reliability estimate was $\alpha = 0.85$. The results indicated that manipulated agreeableness significantly influenced participants' ratings ($M_{\text{agreeable}} = 5.84$, $SD_{\text{agreeable}} = 1.04$; $M_{\text{disagreeable}} = 2.31$, $SD_{\text{disagreeable}} = 1.09$; $F(1, 67) = 188.25$, $p < .01$). Thus, the results confirmed the expected manipulation effects.

***Effects of actor agreeableness and peer extraversion on performance evaluations, promotion recommendations, and rewards*.** To test hypothesis 1b that confederate agreeableness interacted with participant's extraversion to influence evaluations of performance and promotions given to the confederate, we conducted a two-way MANOVA with dependent measures of evaluations and promotion and factors of confederate agreeableness and

participant's extraversion (split at the mean). The main effect of participant extraversion was not significant, Multivariate $F(2, 64) = 1.79$. In contrast, the MANOVA results suggested that the main effect of the manipulated virtual confederate's agreeableness was significant, Multivariate $F(2, 64) = 57.68$, $p < .01$, $\eta^2 = .64$, However, this main effects was qualified by a significant interaction, Multivariate $F(2, 64) = 4.22$, $p < .01$, $\eta^2 = .11$.

ANOVA results of performance evaluations showed a significant interaction effect ($F(1, 65) = 8.46$, $p < .01$). Introverted participants evaluated the performance of agreeable confederates ($M_{agreeable} = 4.19$, $SD_{agreeable} = .47$) as higher ($F(1, 38) = 158.43$, $p < .01$) than the performance of disagreeable confederates ($M_{disagreeable} = 2.12$, $SD_{disagreeable} = .57$). While extraverted participants also evaluated the performance of the agreeable confederate ($M_{agreeable} = 3.98$, $SD_{agreeable} = .83$) as higher than the performance of the disagreeable confederate ($M_{disagreeable} = 2.80$, $SD_{disagreeable} = .63$) this difference was less pronounced ($F(1, 27) = 17.67$, $p < .01$). With regard to promotion recommendations, ANOVA results showed a significant interaction effect ($F(1, 65) = 4.10$, $p < .05$) in that introverted participants gave more positive promotion recommendations ($F(1, 38) = 98.14$, $p < .01$) to the agreeable confederate ($M_{agreeable} = 5.07$, $SD_{agreeable} = .98$) than to the disagreeable confederate ($M_{disagreeable} = 1.94$, $SD_{disagreeable} = 1.02$). Here again, while extraverted participants also gave more positive promotion recommendations to the agreeable confederate ($M_{agreeable} = 5.02$, $SD_{agreeable} = 1.48$) than to the disagreeable confederate ($M_{disagreeable} = 3.13$, $SD_{disagreeable} = 1.63$) this difference was also less pronounced ($F(1, 27) = 10.71$, $p < .01$).

With regard to rewarding the confederate, the results of a logistic regression showed that the effect of participant extraversion was not significant (B=-.97, *ns*) but the effect of the manipulated virtual confederate agreeableness was significant ($B = 4.12$, $p < .01$). In addition, the effect of the interaction was significant ($B = 1.02$, $p < .01$). The results suggested that

introverts were much more likely ($\chi 2 = 32.67$, $p < .01$) to give the reward to the agreeable confederate (21 out of 21 possible rewards)[9] than they gave to the disagreeable confederate (2 out of 19 possible rewards). In contrast, extraverted participants were not more likely ($\chi 2 = 2.66$, *ns*) to give the rewards to the agreeable confederate (11 out of 16 possible rewards) than the disagreeable confederate (5 out of possible 13 rewards).

Mediated moderation effects of person impressions and trait sensitivity. To test whether person impressions and trait sensitivity mediated the relationship between participant's extraversion, confederate agreeableness, and their interaction on performance evaluations, promotion, and reward decisions, we conducted two mediated moderation regression analyses for each dependent variable, using a bootstrap approach with 3,000 iterations (see Preacher et al., 2007). Table 5 shows that when the mediating variable was included in a regression with performance evaluations, promotions or reward as the dependent variable both the coefficients of person impressions and trait sensitivity were significant. Thus, it seems that person impressions and trait sensitivity both mediated the relationship between confederate agreeableness and the three dependent variables. Thus, both hypothesis 2b and 3b were supported. Conditional indirect effects between confederate agreeableness and performance evaluations through person impressions and trait sensitivity showed a significant indirect effect (*person impressions*: $b = -1.33$, $p < .01$; *trait sensitivity:* $b = -1.47$, $p < .01$) for introverted participants. Similar results were found for extraverted participants (*person impressions*: $b = -.62$, $p < .01$; *trait sensitivity:* $b = -1.01$, $p < .01$) but the magnitude of these effects were significantly smaller. The same pattern of results was obtained with regard to promotions and reward as the dependent variables. Table 5 shows that the indirect effects from confederate agreeableness to promotions and rewards through person impression and trait sensitivity were significant for both introverts and extraverts.

[9] Odd-ratio could not be calculated because this cell had only 1s and no zero.

However, in all cases the magnitudes of these indirect effects were stronger for introverts than they were for extraverts.

DISCUSSION

Do introverted individuals experience and evaluate dyadic work relationships differently than extraverts? In a field study using enduring teams and an experimental study with controlled electronic confederates, we demonstrate that introverted (but not extraverted) peers show heightened sensitivity to the interpersonal traits (i.e., agreeableness and extraversion) of others. Introverted (but not extraverted) peers evaluated the performance of their disagreeable and extraverted team members significantly more negatively and offered them less rewards than they did for their agreeable and introverted team members. Further, this systematic effect on performance evaluation was replicated even when objective performance was held constant, by the virtue of the attention that individuals devote to observing others' traits and as a function of the more negative person impressions constructed by introverted peers. Taken together, the results of our studies offer meaningful theoretical contributions to literatures on dyadic workplace interactions, personality in organizations, and accuracy in performance appraisal.

Theoretical contributions

Our research first contributes to theory on dyadic workplace interactions. Krasikova and LeBreton (2012) have recently argued that a significant misalignment exists between theory and method in our study of dyadic phenomena, wherein researchers fail to capture the interactive contributions of each partner and the emergent effects which arise between them. Accordingly, we demonstrate that the negative effects of one's presence on others can actually vary as a function of the observer's own traits. Specifically, while extraverts may not find the interpersonal traits of others aversive, introverts appear vulnerable to experiencing heightened

negative affectivity in the presence of extraverted and disagreeable others. We suggest that other "emergent profiles" of interpersonal aversion may exist, which are largely hidden due to contingency effects of the traits of the observer.

Second, we note that our results appear to complicate an existing body of research on complementarity effects which suggests that one should prefer interaction partners whose interpersonal style compliments (as opposed to mimics) one's own. Those who are submissive, for example, would prefer interaction partners who would take charge. Conversely, those who are dominant would prefer interaction partners who would cooperate and even submit to their wishes (Grant et al., 2011; Kiesler, 1983; Moskowitz, 2009; Tiedens & Fragale, 2003). However, these apparent inconsistencies may be due to several meaningful factors. Because status moderates complementarity relationships (Moskowitz, Ho, & Turcotte-Tremblay, 2007), we find that dominant traits can actually negatively affect more submissive individuals in more lateral peer relationships (where dominating behaviors may be viewed as less legitimate). And, while prior work has shown that extraverts are generally perceived as having greater positive impact on team performance, this work does not focus on the personality of the raters themselves (Barry & Stewart, 1997) or only complementarity with respect to the average extraversion of the entire team (and consequent attraction to the team unit) rather than dyadic peers (Kristof-Brown, Barrick & Stevens, 2005). Future research should explore with greater granularity the boundary conditions of complementarity while considering dyadic composition and features of the team context simultaneously. Our findings tentatively suggest that *dyadic* dominance complementarity effects may be limited to hierarchical (supervisor/subordinate) relationships, such that dominance behavior may actually be penalized by introverted peers working within self-managed teams, peer-to-peer interactions, or other lateral work arrangements. We suggest that

similar effects might be found in other lateral dyads, including customer-provider relationships.

Additionally, our research contributes directly to personality research. Extant studies have shown heightened sensitivity of introverts to external stimuli (e.g., Barnes, 1975; Haier, Robinson, Braden, & Williams, 1984; Schalling, 1971) and slower habituation and adaptation to aversive stimuli (Eysenck, 1957). Our studies are the first we know of to extend this general effect to include sensitivity to the traits of other human beings, which opens new opportunities for understanding how Big 5 traits drive our experience and interpretations of other people.

Moreover, our studies demonstrate that introverts appear to attend to different information when constructing person impressions than extraverts do. Due to a preference for relational outcomes in groups and greater aversion to those who might disrupt social harmony within interdependent contexts, introverts are more likely to pay additional attention to the interpersonal traits of their team members. Because accurately judging traits in others requires the careful deployment of cognitive resources (Funder, 1995) person judgments are necessarily incomplete pictures of what an individual is "really like" (Srull & Wyer, 1989). Accordingly, by demonstrating that introverts show heightened sensitivity to interpersonal traits of others, we generate important new questions about what trait information is potentially overlooked in the process. These findings also suggest that other systematic differences in how peers construct person judgments of others as a function of personality traits should be explored.

Finally, our research has important implications for theories of performance assessment and ratings (Wherry & Bartlett, 1982). While performance evaluations are often used as a criterion measure in management (Borman, White, & Dorsey, 1995) few studies to date have investigated the interactional effects of the characteristics of the observer of performance (i.e., supervisor, peer) with the characteristics of the actor. First, our results (Study 1) show that when

partitioning the variance of performance evaluation to its components, the variance accounted by the ratee (13%) is half of the magnitude of the variance accounted by the rater (26%) and about a third of the variance accounted by the relationship (36%) between the two parties. Assuming such results generalize to other studies, our research demonstrates that potential sources of bias may be "hidden" as emergent properties of dyadic interactions. Whereas rater effects leading to variance in evaluations are frequently described as "bias," we uncover the possibly more influential effects driven by characteristics that live not within the observer or the actor, but as an emergent property of the dyad itself. We believe that such an "emergent dyadic source of bias" approach may very well be useful in considering non-personality domains of performance appraisal. For instance, while traditional approaches to studying race and gender bias in the workplace tend to examine characteristics of the rater including implicit bias (Hekman et al., 2010), an examination of bias as emergent dyadic property might better explain why some female and minority candidates still thrive in a presumably biased environment (i.e., a potential immunity effect based upon not triggering the biases of raters).

Second, because we held objective performance constant in Study 2 (and manipulated only performance irrelevant trait expressions), we demonstrate that some source of influence unrelated to individual performance infiltrates evaluations of disagreeable and extroverted others made by introverted peers. At a minimum, these findings suggest that introverts differentially attend to the interpersonal aspects of performance, and less to the instrumental outcomes associated with individual task performance. Whereas we suggest that this variance meets the strict definition of bias described in rating theory (Wherry & Bartlett, 1982), we believe the implications may be more profound. As workplaces become increasingly interdependent and collaborative (Ilgen & Pulakos, 1999), the notion of individual task performance within

interdependent settings may be simplistic. By including evaluations of interpersonal behavior in performance ratings, introverts may simply be accounting for the negative impact disagreeable and dominant team members may have on the performance of others (Porath & Erez, 2007). As the philosopher Jean-Paul Sartre noted, "Hell is other people," in that there is no objective reality of ourselves in the absence of how others view us--this logic may hold especially true for what it means to perform as an individual within interdependent settings.

Limitations and directions for future research

Our studies are necessarily limited by our ability to tap hidden psychological processes and consider plausible moderating circumstances. First, while objective performance (number and quality of responses by the confederate) and performance-relevant behavior (time spent thinking and "chatting" with other players) was held constant across conditions in Study 2, performance is a multi-dimensional construct. Accordingly, the penalty assigned in performance evaluations and rewards and promotions given as a function of agreeableness and extraversion may not necessarily represent "bias" in appraisal. Because teamwork is necessarily interdependent, extraverted and disagreeable behaviors including interpersonal rudeness (Porath & Erez, 2007) that may have a negative impact on the performance and creativity of others can be viewed as counterproductive behavior. Thus, the sensitivity of introverted peers may actually represent detection of behaviors which are anticipated to hurt collective (but not individual) performance. Thus, introverts may actually be evaluating the performance of disagreeable and extraverted actors more holistically, and not less accurately. Future research should examine whether introverts are making more accurate judgments of *performance,* or simply more accurate judgments of *personality* which then influence their interpretations of performance (including the criteria they choose to focus on). Specifically, future research might build upon our findings

using performance tasks specifically designed to capture memory processes typically involved in appraisal bias, including memory sensitivity (Pr) and decision criterion (Br; see Martell & Leavitt, 2002).

Second, our study focused on dyadic pairs within team work encounters. While dyads are the primary unit of workplace interaction (Kenny et al., 2006), a controlled dyadic study design does not allow for organically occurring team behaviors transpiring outside of the dyadic interaction, which may attenuate the effects we have found. For example, additional team members might serve to buffer introverted observers from the negative interpersonal qualities of extraverted and disagreeable team members by serving as intermediaries, actively managing such relationships for the benefit of the team or encouraging introverted peers to re-construe facets of extraversion and agreeableness (e.g., "she's not aggressive; she's passionate!").

Third, our design (Study 2) did not allow for testing a three-way interaction of observing peer introversion with both agreeableness and extraversion of the actor, as effectively manipulating both traits within a single virtual confederate and a limited encounter time would be nearly impossible. We believe that such a three-way interaction is unlikely, as introverted peers responded unfavorably to both disagreeableness and extroversion on the part of others; it is unlikely that the expression of both traits would somehow attenuate the effect. Nonetheless, future research should more specifically tease out the subtle differences in how introverted peers process trait information for agreeableness and extraversion.

Relatedly, the necessarily limited social encounter within Study 2 required coarse and salient manipulations of personality—while this experimental design allowed us to test for causal and mediating mechanisms of our effects, it also generated limitations. First, our effects may have been amplified by our specific instructions telling participants to pay attention to

personality. Thus, a focus on interpersonal traits early in acquaintanceship might actually have encouraged participants to over-rely on the negative stereotypical aspects of extraversion. Second, because of the limited interaction time our manipulation relied partly on self-descriptions of traits to make subsequent behaviors more salient. Future research using extended interactions might rely on manipulations and manipulation checks of trait-consistent behavior (rather than descriptions of traits) to explore how person impression formation might be affected when participants are given a less clear framework for identifying the traits of others. Finally, our limited interaction design required us to describe the introverted confederate partly through shyness, which may signal underlying neuroticism (social anxiety) in addition introversion. However, we note that despite these necessary limitations of the experimental design, the general findings of Study 2 are parallel to those from the more naturalistic setting of Study 1. Moreover, the presence of an interaction effect in the absence of a main effect (i.e., differential ratings only appear for an extraverted confederate rated by more introverted participants) suggests that our effects are not likely driven by heavy-handed features of the manipulation (which would likely effect both introverted and extraverted participants similarly).

Finally, the majority of individuals are neither deeply introverted nor extraverted (Grant, 2013) but our experimental design used clear and perhaps extreme manipulation of extraversion. Although our first study, in which we found the same effects as in out experimental study, measured introversion/extraversion using a continuous scale, future research should explore and specify threshold points at which individuals become negatively affected by those around them.

Implications for practice and organizations

Our research offers practical insights for both employees and organizations. First,

individuals high in extraversion and disagreeableness should be made aware that their trait-relevant behaviors may have a profoundly negative impact on how introverted individuals experience their dyadic encounters, and may lead to reduced performance evaluation or rewards giving for collective accomplishments. Second, while loyalty to companies may be disappearing in the modern workplace, loyalty to colleagues is not (Cascio, 2003). Individuals may work hard because they do not want to let their peers or supervisors down, and may stay in the organization just because they do not want to avoid separation from liked colleagues. To engender worker commitment, organizations often build social ties through informal events or Friday-afternoon socials in hopes of creating community within the organization (Cascio, 2003). Our results suggest that considering the personalities of people in the workplace may also affect commitment to the organization by affecting the satisfaction of individuals with their colleagues, and that events designed to increase cohesion through social encounters may have the opposite effect for certain dyadic combinations. Managers should consider constructing dyadic work encounters in ways which promote positive and limited exposure to interpersonal traits which may overwhelm introverts.

Finally, the modern workplace is becoming increasingly interpersonally demanding of its workforce as it is characterized by little privacy (Jungck & Rahman, 2011), frequent teamwork (Ilgen 1999) and abundant meetings (Rogelberg, Allen, Shanock, Scott, & Shuffler, 2010). These work arrangements require employees to continuously see, overhear and interact with their colleagues. Such a work design is likely to overstimulate introverted employees, while extraverted employees may contribute more than their share of the stimulation. Hence, organizations may consider ways to limit the amount of interpersonal exposure introverts are asked to take in. Indeed, a recent Wallstreet Journal article reports that, specifically, to help

introverts, office furniture makers now build "quiet spaces" that are designed to help introverts relax and get away from stimuli that overwhelm them (Feintzeig, 2014). These "quite spaces" for introverts may also indirectly help extraverts, given that introverts' discomfort with extraverts may be expressed in the performance appraisals of and reward giving to their extraverted counterparts.

Conclusions.

As more organizations rely on flatter, self-managed team structures over traditional hierarchies (Humphrey, Hollenbeck, Meyer, & Ilgen, 2007), peer evaluation has become increasingly influential in determining key career and reward outcomes within organizations (Antonioni, 1996). While research to date has identified rater personality characteristics which may lead to leniency in appraisal (Bernardin, Cooke, & Villanova, 2000), our studies are the first we know of to demonstrate the interaction of rater/target characteristics creating potential sources of rating effects. Our findings allow both a note of caution about peer ratings, and the practical advice that actor-peer effects should be actively monitored and corrected for in formal appraisal and promotion and rewards decisions. In conclusion, we show that dyadic interactions between coworkers' personalities have significant emergent influences on the way employees experience and evaluate their coworkers. We hope that these results will help further shift the conversation in the study of organizational life from the asocial absolute to the inherently relational.

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TABLE 1

Means (M), Standard Deviations (SD), and Intercorrelations among Study 1 Variables

	Mean	s.d.	1	2	3	4	5
1. Performance evaluations	4.10	.87	---				
2. Extraversion of actor	3.58	.75	-.14	---			
3. Agreeableness of actor	4.14	.51	.25	.06	---		
4. Extraversion of peer	4.10	.49	.12	.03	.07	---	
5. Agreeableness of peer	3.60	.71	.08	.06	.03	.30	---

Notes. N = 80-83 dyads. Correlations greater than |.29| are significant at $p < .01$ level. Correlations greater than |.17| are significant at $p < .05$ level. The mean, standard deviations, and intercorrelations are averaged across the three data sets of independent dyads.

TABLE 2

Effects of Peer and Actor Personality on Actors' Performance Evaluations, Study 1

	Performance Evaluations		
Regression	Data Set 1	Data set 2	Data set 3
Actor extraversion (AE)	-.26**	-.19*	-.19*
Actor agreeableness (AA)	.45**	1.71**	.68**
Peer extraversion (PE)	.23*	1.57*	.09
Peer agreeableness (PA)	.05	.09	.19
AE x PE	.21*	.13*	.18*
AA × PE	-.24**	-.36*	-.20*
Variance explained by model	12%	4.7%	6.4%
Simple slopes analysis			
Actor Extraversion	I: -.41** E: .12	I: -.28** E: -.09	I: -.32** E: .12
Actor Agreeableness	I: .63** E: .28	I: 1.96** E: .83*	I: 1.45** E: .55*

Notes. * p < .05, **p < .01. N (Data Set 1) = 83, N (Data Set 2) = 81, N (Data Set 3) = 80. The coefficients are unstandardized. I = Peer introvert (one SD below mean of extraversion), E = Peer extravert (one SD above mean of extraversion).

TABLE 3

Means (M), Standard Deviations (SD), and Intercorrelations Among Study 2 Variables

	Mean	s.d.	1	2	3	4	5	6	7
1. Performance evaluations	3.16	.99	---	.72	.54	.68	-.35	-.05	-.27
2. Promotions	3.68	1.59	.84	---	.67	.52	-.36	-.13	-.24
3. Reward	.62	.69	.74	.67	---	.56	-.11	-.16	-.13
4. Person impressions	3.03	1.02	.89	.78	.71	---	-.18	-.11	-.14
5. Trait sensitivity	---	---	.89	.77	.70	.93	---	-.11	.56
6. Peer extraversion	3.46	.78	.24	.33	.00	.24	.26	---	.00
7. Manipulation	---	---	-.79	-.72	-.65	-.74	-.83	-.16	---

Notes. N = 135 (agreeableness condition N = 69 [Agreeable (0) = 37, Disagreeable (1) = 32], extraversion condition N = 66 [Introvert (0) = 43, Extravert (1) = 23]). Agreeableness condition below diagonal; Extraversion condition above diagonal. Means and SD are of the combined sample. Correlations greater than |.31| are significant at the $p < .01$ level. Correlations greater than |.24| are significant at the $p < .05$ level. The descriptives of trait sensitivity agreeableness were M = 3.11 (SD = 1.25) and for extraversion M = 2.16 (SD = 1.04).

TABLE 4

Extraversion Condition Moderated Mediation Regression Results

Dependent Variable	Performance Evaluation		Promotion		Reward	
Mediator Variables	*Person Impression*	*Trait Sensitivity*	*Person Impression*	*Trait Sensitivity*	*Person Impression*	*Trait Sensitivity*
Mediator	.70**	-.20	.79**	-.44*	.41**	-.03
Peer's Extraversion (T)	-.86	-1.59**	-1.85*	-2.50**	-.92*	-1.41**
Actor's Extraversion (C)	-1.32*	-1.79*	-2.28*	-2.25	-.88	-1.38*
T x C	.64	1.00*	1.15	1.36*	.52	.81*
Conditional Indirect Effect	I: -.44* E: .10	I: -.34 E: -.16	I: -.50* E: .11	I: -.74* E: -.35	I: -.26* E: .06	I: -.04 E: -.02

Notes. N = 66 [Introvert (0) = 43, Extravert (1) = 23]). **p < .01, *p < .05. Peer is the participant and actor is the virtual confederate. I = Peer's Introversion Indirect path, E = Peer's Extraversion Indirect path.

TABLE 5

Agreeableness Condition Moderated Mediation Regression Results

Dependent Variable	Performance Evaluation		Promotion		Reward	
Mediator Variables	*Person Impression*	*Trait Sensitivity*	*Person Impression*	*Trait Sensitivity*	*Person Impression*	*Trait Sensitivity*
Mediator	.58**	.62**	.83**	.76**	.24*	.27*
Peer's Extraversion (T)	-.49	-1.44	-.49	-2.14	-1.13	-1.48
Actor's disagreeableness (C)	-.93*	-1.03*	-1.41	-1.93	-.84	-.84
T x C	.18	.43	.23	.68	.31	.40
Conditional Indirect Effect	I: -1.33** E: -.62**	I: -1.47** E: -1.01**	I: -1.90** E: -.88**	I: -1.83** E: -1.25**	I: -.55* E: -.25*	I: -.64* E: -.44*

Notes. N = 69 [Agreeable (0) = 37, Disagreeable (1) = 32]. **p < .01, *p < .05. Peer is the participant and actor is the virtual confederate. I = Peer's Introversion Indirect path, E = Peer's Extraversion Indirect path.

FIGURE 1

Interactive Effects of Peer and Actor Extraversion on Peer's Performance Evaluations of Actor

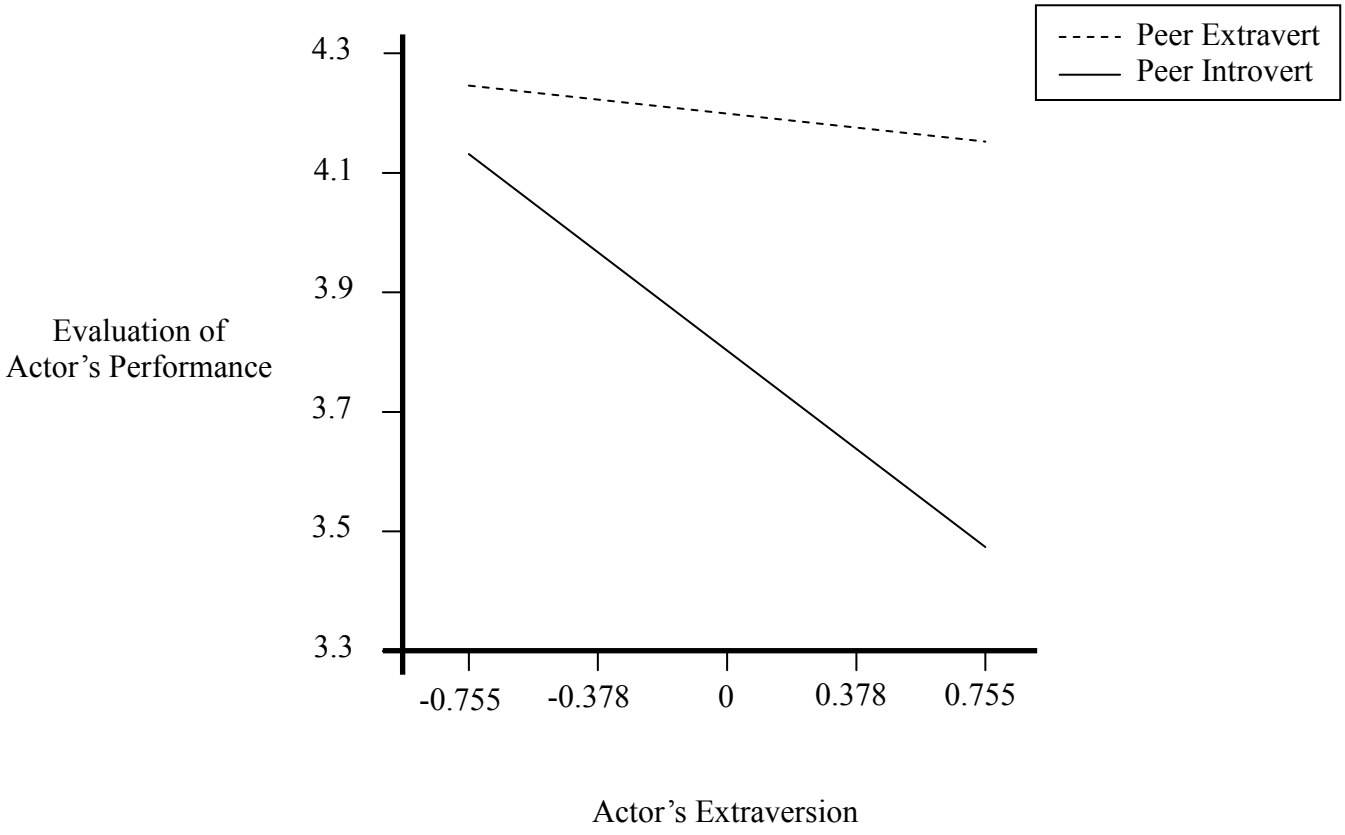


FIGURE 2

Interactive Effects of Peer Extraversion and Actor Agreeableness on Peer's Performance Evaluations of Actor

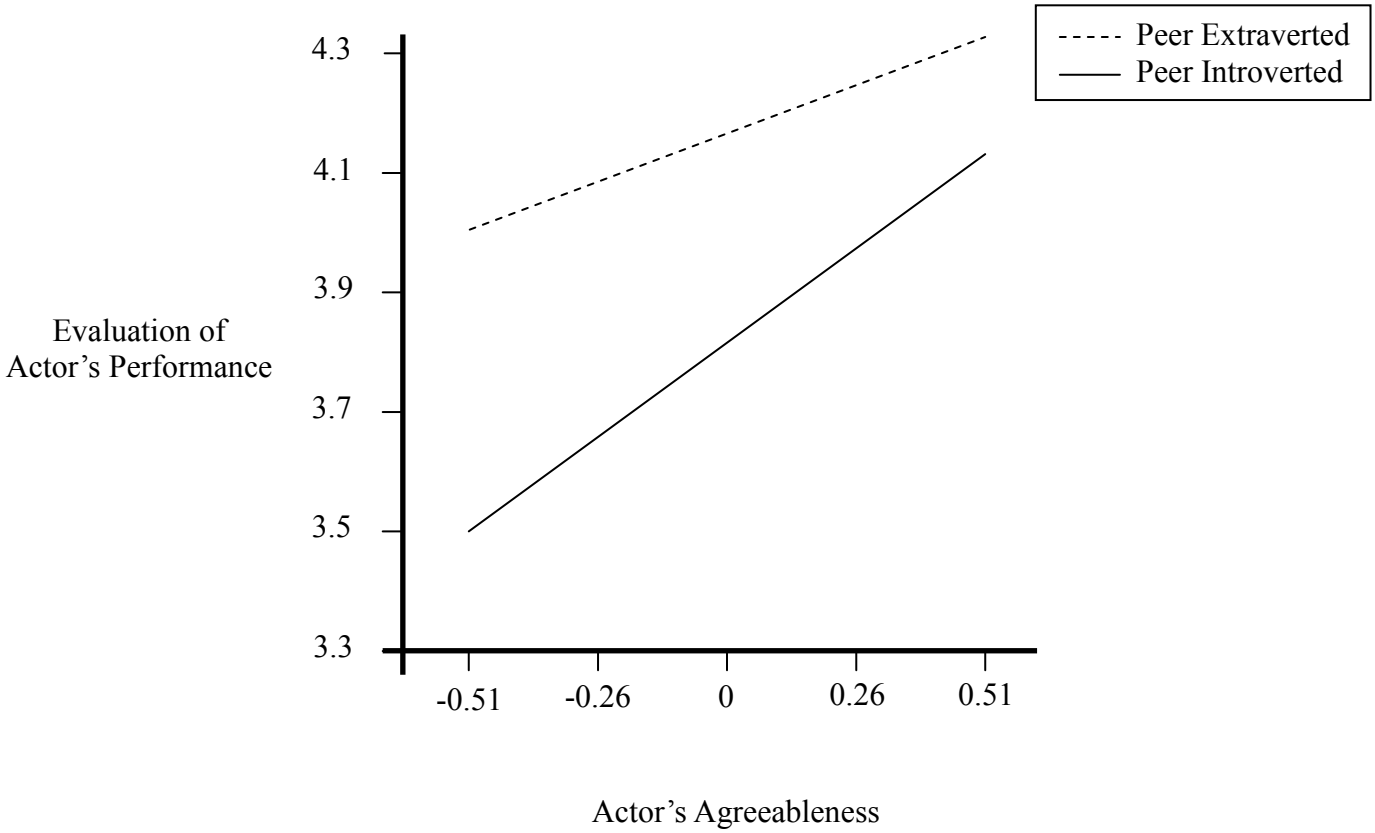
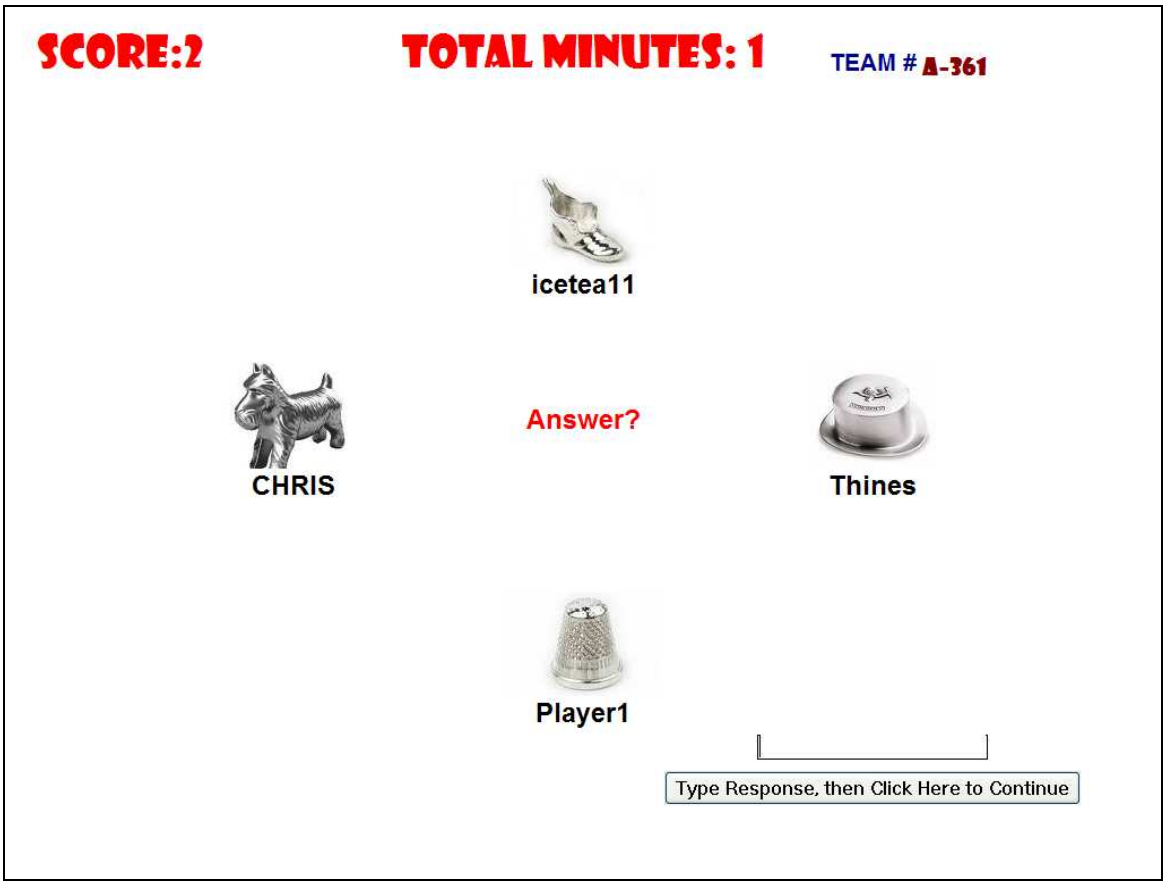


FIGURE 3

Screenshot of Synergize! Game in Play



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