Do Friends Perform Better?:
A Meta-Analytic Review of Friendship and Group Task Performance

THESIS

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By

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Abstract

In the current paper, I develop and test a theoretical model aimed at understanding the relationship between friendship and group performance. Specifically, using data from 924 teams in 24 studies, I tested my hypothesized main effect, and key moderator analyses, for how working with friends, versus non-friends, would influence group task performance. Results show that friendship has a positive effect on group task performance ($d=0.45$). Furthermore, as expected this effect was moderated by task interdependence and task focus/emphasis (i.e. maximizing versus optimizing). In addition to detailing which paths of the model were supported by the data, in my discussion section I detail gaps in the literature and future directions for research in this domain.

Keywords: friendship; group task performance; meta-analysis

Dedication

This document is dedicated to my parents, Chan Hyoung Chung and Kyung Ok Min,
who have always encouraged and supported me in my life.

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Introduction

Within groups and organizations, the importance of friendship is often well understood. Friends are considered a special form of relationship because they are neither family, where one is tied to another by blood or law, nor strictly superficial co-workers in the workplace, where one may be tied to another by explicit organizational or psychological contracts. Consequently, researchers in various domains have tried to examine the effect of friendship on various interpersonal and group outcomes. For instance, friendship has been found to affect learning (Kutnick & Kington, 2005; Foot & Barron, 1990) and collaboration (Miell & MacDonald, 2000; MacDonald, Miell, & Morgan, 2000; Andersson, 2001) amongst students in the classroom. In addition, friendships in organizations have been found to improve organizational performance (Mehra, Kilduff, & Brass, 2001) and increase job satisfaction (Winstead, Derlega, Montgomery & Pilkington, 1995; Morrison, 2002).

Given the potential impact that friendship may have on a host of organizational outcomes, it is no wonder that much attention has been paid to further understanding the impact of friendship in groups. However, current research lacks consensus regarding the positive or negative effect of friendship on group performance. While some research has suggested a positive effect of friendship on group performance (e.g., Jehn & Shah, 1997; Shah & Jehn, 1993; Harrison, Mohammed, McGrath, Florey, & Vanderstoep, 2003),

other research has documented that friendship negatively impacts performance (e.g., Andersson & Ronnberg, 1995; Swenson & Strough, 2008). In light of these mixed findings, the overall effect of friendship on group performance remains unclear. In the current research, I seek to clarify the relationship between friendship and group outcomes, by detailing a theoretical model, and testing my proposed hypotheses through conducting a meta-analysis (Lipsey & Wilson, 2001) of this literature.

In this thesis, after introducing the construct of friendship and reviewing the literature, I detail my theoretical model for how friendship is established, and apply Steiner (1972)'s taxonomy of group processes (e.g., motivation and coordination) to argue for how and why friendship may result in increased or decreased group task performance. Following this, I systemically integrate existing empirical findings to meta-analytically (Lipsey & Wilson, 2001; Hedges & Olkin, 1985) estimate the overall effect of friendship on group task performance. Lastly, I identify several moderators of the effect of friendship on group task performance to better inform under what conditions friendship may lead to increased or decreased group task performance.

Literature Reviews and Theoretical Background

A Theory of Friendship

Theories of friendship have been widely discussed by child education and educational psychologists, who have long been interested in whether teachers should have students work with friends or non-friends to optimize performance. Friendship, as first introduced by Suttles (1970), was defined as the least ‘role-bound’ or ‘programmed’ interpersonal relationship developing insidiously. Wright (1978) later suggested that friendship has two major characteristics: 1) voluntary interaction (i.e. spending time together), and 2) a personalistic focus (i.e. each person reacts to the other and shows respect in the relationship). Scholars have further built upon this definition of friendship further arguing that friendship exists under a particular set of conditions or interpersonal characteristics (i.e., degree of interaction, length of relationship, shared history, similarity of values, trust) (Halpern, 1994; Krackhardt, 1992).

Although each conceptualization of friendship contains different components or values, all of these scholars agree that friendship has three components: 1) *liking behavior* in the relationship, 2) *shared experiences* from the past, and 3) *reciprocity*. Thus, in this paper, I propose and define friendship according to these three features. First, liking behavior includes affective elements, or trust in others’ values. Second, shared experiences embrace frequency and quality of prior interaction and past

relationship building. Third, reciprocity refers to equal liking behaviors exhibited from one partner to another in a friendship (Ross, Cheyne & Lollis, 1988). As such, my definition of friendship exacts a specific level of closeness and liking which differs from how people now use the term friend on the social networking website *Facebook*. Although someone might have 5,000 *Facebook* friends for the typical person who has 5,000 *Facebook* friends, a very small percentage of these people would likely qualify as friends based on the criteria above. In the following sections, I further discuss the construct of friendship and detail how it differs from other related constructs associated with familiarity and closeness.

What makes Friendship Unique?

While the majority of research on social relationships often examines interpersonal interaction based on economic or social exchange theories (Thibaut & Kelley, 1959), friendship does not begin with a planned agreement, statement or announcement. For example, in business, producers rarely give products to customers without any monetary benefits in return. Therefore, people should not desire to build relationships when there are high explicit and implicit costs as compared to the potential benefits that they may earn. However, within friendships, people are generally not as concerned with a reciprocation of benefits (Jehn & Shah, 1997; Clark & Mills, 1979). As

such, friendship is primarily based on psychological mechanisms and the positive experiences of interacting and working with friends.

Friendship is also distinct from other constructs associated with liking between individuals, such as cohesion, familiarity, network density, closeness and intimacy. For example, on the surface cohesion may seem to be similar conceptually to friendship. While both cohesion and friendship share interpersonal intimacy among group members (Shah & Jehn, 1993; Evans & Dion, 1991), not all cohesive groups include friendships between team members. Moreover, while friendship may be considered a type of ‘strong tie’ (Krackhardt, 1992), not all strong ties are considered friendships. A tie may be considered strong if it fulfills one or two of the elements of friendship, but friendship only exists when the relationship encompasses all three components (i.e., liking behaviors, shared experiences, and reciprocity). As such, for the current study, I exclusively focus on examining friendships within groups, excluding groups that may be conceptualized or measured as cohesive or contain social network ties, but do not fulfill all of the required elements of friendship.

Friendship Structure

According to Adams & Blieszner (1994)’s *Integrative Friendship Framework*, friendship consists of structure, phases, and interactive processes. That is, friendship structure (i.e. patterns and connections) and phases (i.e. formation, maintenance and

dissolution of friendship) will be developed or disappear through a series of interactive processes.

In contrast to groups containing friendships, groups consisting of non-friends are defined as an “aggregate of acquaintances, strangers, and disliked-peers” (Newcomb & Bagwell, 1995). Jehn & Shah (1997) described ‘acquaintance groups’ as a group with limited familiarity and contact among members. Moreover, while one may categorize platonic relationships on a continuum of intimacy (e.g., ranging from enemy on one extreme to best friend on the other), I dichotomize friendship, treating ‘friends’ as being qualitatively different than ‘non-friends’. In this paper, I refer to groups of strangers in as being ‘non-friends’ given the clear differences between friends and non-friends. Whereas non-friends can range from being enemies to acquaintances, friends tend have a level of degree of liking behavior, shared experiences, and positive reciprocity (see Figure 1), which are exclusive interpersonal qualities that are not exhibited by strangers. Also, strangers and acquaintances have low shared experience and low liking compared to friends. On the other hand, enemies may have some shared experiences, however they are quite distinct from friends given their relationships are characterized by negativity and dislike. Accordingly, in the model I develop in Figure 1 below, rather than looking at the range of relationships — that is, a linear progression from enemy to best friend — I would argue that one could think of the jump from acquaintance to friend to represent a

step function, whereby there is a much larger difference moving from acquaintance to friend, than you would see moving from stranger to acquaintance.

Figure 1. A Continuum of Intimacy on Friendship

Group Processes: Friends vs. Non-Friends

It is not only important to understand how and when friendship affects groups, but also to understand *why* friendships may lead to different group performance outcomes. Group processes, or the behaviors or interactions among group members, often underlie how and why some groups perform better or worse than other groups (Steiner, 1972). Steiner (1972)'s influential model of group performance suggests that groups often incur motivational or coordination process *losses* (where actual performance of the group is less than the anticipated performance given the individuals within the group). Although

not explicitly recognized by Steiner, other scholars have suggested that certain people working together in groups may experience motivational or coordination process *gains* (where actual performance of the group is greater than the anticipated performance given the individuals within the group) (Hackman & Wageman, 1995; Nijstad, 2009).

Specifically, motivational process losses (or gains) may occur when individuals in a group work less (or works harder) than they would if they were working alone. Likewise, coordination process losses (or gains) may occur when groups of individuals perform worse (or better) than the best individual member in the group, due to the combined effective mixture of their resources and efforts (i.e. coordination). Below, I describe the underlying reasons for why one may anticipate both motivation and coordination process gains when friends work together. Namely, I propose below that, relative to strangers, when friends work together motivation will be increased via increased commitment, and that coordination will be improved through increases collaboration, communication, and conflict management.

Motivation

Decades of research have documented that social loafing (Latané, Williams & Harkins, 1979) and free-riding (Kerr, 1983) underlie reductions in motivation which often plague groups (see Karau & Williams, 1993 for a review). Whereas research has identified structural factors, such as reducing anonymity or adding an incentive for good

performance, to help reduce loafing, it is important to note that more ‘social’ factors have been documented to also affect motivation on group tasks. Namely, consistent with the predictions of the *Collective Effort Model* (Karau & Williams, 1993), individuals work harder on group tasks when they identify with their group. When individuals identify and care about the welfare of the group, they are more inclined to work particularly hard for the group in an effort to help the group experience its goal.

As close friends interact, they begin to espouse aspects of each other into their senses of self (i.e. self-expansion theory; Aron & Aron, 1997). People enjoy this sense of self-expansion as they expand and grow throughout their interactions with others in close relationships. In friendships, people can experience an increased emotional attachment to the relationship, or group that they belong, ultimately increasing commitment to that group. This increased commitment is likely to lead to increased task effort (Newcomb & Brady, 1982), resulting in better performance. Similarly, Klein, Molloy and Brinsfield (2012) posit that perceptions of interpersonal similarity are likely to lead to increased commitment in conjunction with positive affect and trust (i.e., *Process Model of Commitment*). Commitment with the group encourages members to not only perform well (Klein & Mulvey, 1995), but also to work harder in the group (Tesser, Millar & Moore, 1988). Taken together, when working with friends, increased commitment towards their fellow group members and towards the group’s goals should fuel increased motivation for the group to perform well.

Coordination

Effective coordination of group members depends on group members being able to share and integrate relevant information with one another. Inefficiencies and coordination losses commonly documented to hinder group performance often suggest that group members' lack of information exchange underlies coordination problems. Part of this ability to perform well begins with a simple desire to work collaboratively with another person. When people perceive themselves to be similar to one another, they are more likely to share ideas, and care more about each other's outcomes than in group tasks. When friends are doing their task together, they are often more willing to collaborate than non-friends would be. Friends are more familiar with one another, and better able to recognize their interpersonal similarities than non-friends (Ladd & Emerson, 1984). Thus, friends are more likely to communicate about the task at hand and exchange information without reluctance, leading to increased collaboration among friends.

People not only like similar others more than dissimilar others (Berscheid & Reis, 1998; Byrne, 1971), but they also prefer to communicate with people who they see as being similar. Effective communication requires that individuals understand shared values and perspectives from one another. Dissimilar values and norms among people (i.e. non-friends) make it difficult for them to find common values to share which may

discourage performance. On the other hand, friends with similar values talk with one another openly and thus have fewer communication difficulties than non-friends.

When group members are expected to share their perspectives and approaches with one another, differing opinions and conflict may arise. The degree to which conflict is managed can have important implications for how effective groups are at successfully coordinating information. Effective management of conflict relies upon both a willingness to engage in productive conflict, commonly referred to as task conflict, and to minimize and reduce negative conflict, commonly referred to as relationship conflict. Jehn and Mannix (2001) have suggested that task conflict occurs when there are differences in viewpoints and opinions pertaining to a group task which may lead to disagreement among group members. On the other hand, relationship conflict occurs when there is interpersonal incongruity, which creates tension and friction amongst group members. Both types of conflict are a normal part of group life, however, how it is managed can shape whether it is productive or harmful for groups. Given the positive relationships between group members that are friends, they may have the ability to garner the positive aspects of task conflict, while minimizing the negative effects (and existence of) relationship conflict. Task conflict may be less likely to damage friendships because — given the established history of their relationship — friends are more comfortable challenging each other as compared to non-friends (Gruenfeld, Mannix, Williams & Neale, 1996). In addition, Simons and Peterson (2000) documented that task conflict can

produce positive outcomes, even when some relationship conflict is present. This likely occurs when team members have high levels of trust in one another. In high trust environments, team members are less likely to take confrontations personal, and are less likely to get angry or upset when someone engages in potentially rude/upsetting behavior (e.g., being interrupted while speaking or having a person continue to disagree with your point of view). As such, due to increased trust and familiarity with one another, friends may both be willing to engage in more productive task conflict (instead of shying away from it as strangers may), and may also be able to garner the benefits from this task conflict without it leading to relationship conflict.

Taken together, given the potential reasons for why working with friends may increase motivation and coordination, it is hypothesized:

Hypothesis 1: Groups composed of friends will perform better than groups composed of non-friends.

Task Moderators for Group Performance

Consistent with influential contingency-based models of organizational behavior (e.g., Thompson, 1967; Lawrence, Lorsch & Garrison, 1967; Galbraith, 1973), there are likely contextual factors that may moderate the anticipated positive relationship between friendship and group performance. The model I have proposed (see Figure 2 in page 15), explicitly identifies several key moderators which I detail in the section below: task

interdependence (high versus low), task types (physical versus cognitive), task emphasis/focus (maximizing versus optimizing), and group size (dyad versus larger group).

Task interdependence

Task interdependence is defined as the extent to which a task needs group members to interact in order for it to be performed effectively (Thompson, 1967; Van de Ven & Ferry, 1980). Thompson (1967) originally conceptualized interdependence in organizations as pooled, sequential or reciprocal. In pooled interdependence each unit performs completely separate functions which can be added together. Sequential interdependence occurs when one unit produces an output which is then turned over to the next unit to continue working on. Lastly, reciprocal interdependence is similar to sequential interdependence in that the output of one unit becomes the input of another, however it involves more back-and-forth interaction between units unlike the linear sequencing present in sequential interdependence. The degree of interdependence depends on the tasks people perform and it will determine the amount of member interaction necessary (Kelley & McGrath, 1985; Steiner, 1972). Pooled and sequential interdependence can be categorized as having lower required interdependence (i.e. group performance is the sum of the overall independent outcomes produced by individual group members), whereas reciprocal interdependence can be categorized as having high

interdependence (i.e. tasks require frequent interaction of group members in order to perform effectively).

Consequently, in settings with higher interdependence, group members need to engage in more coordination to effectively solve the task together. The higher frequency of interactions required by highly interdependent tasks require effective communication and teamwork to perform well. In such settings, the ability of team members to coordinate and collaborate effectively with one another should be particularly related to downstream performance. Under such settings, friends, relative to non-friends, should be more able to work effectively with one another. Thus, I hypothesize:

Hypothesis 2: Task interdependence moderates the positive relationship between friends and group performance, such that the positive relationship will be stronger when there is high task interdependence as compared to low task interdependence.

Task focus or emphasis of task

The task focus, or emphasis of the task, is distinguished by maximizing or optimizing tasks (Steiner, 1972). Maximizing tasks have physical criteria such as quantity, distance, or time (Laughlin, 2011; Barron & Kerr, 2003). Generally, these tasks require a greater quantity of an outcome to be evaluated as the better. On the other hand, optimizing tasks focus on the quality of performance (Laughlin, 2011; Barron & Kerr, 2003), and accordingly, optimizing tasks require a correct or optimal answer.

When people in groups know each other very well (i.e., groups composed of friends), they should feel more comfortable with, and are easily attracted to, one another (Brewer, 1979; Tajfel & Turner, 1986). Friends, relative to strangers, care about each other's outcomes within the group and are likely to share ideas to make the outcome better. Thus, groups composed of friends should facilitate maximizing tasks and outcomes. Also, expectancy theory (Vroom, 1964) suggests that friends will perform better than non-friends — by setting reliable and achievable goals — because friends know each other's performance expectancies and effort thresholds better than non-friends. In addition, when friends share ideas and collaborate they can set reliable and achievable goals, which help to improve person's commitment and motivation toward producing a high number of outcomes (i.e., maximizing). Thus, I hypothesize that maximizing tasks (i.e., ones that focus on quantity-based outcome) will be more effective for friends as they will encourage groups to set goals and achieve as many of these goals as possible.

Hypothesis 3: Maximizing tasks will moderate the relationship between friends and group performance such that the positive relationship will be stronger when they are completing a maximizing task as compared to when they are completing an optimizing task.

Group Size

Some research has examined how group size affects group performance (Hackman & Vidmar, 1970; Bray, Kerr & Atkin, 1978; Wheelan, 2009). For instance, groups that are larger have been documented to experience more social loafing and free-riding as compared to smaller groups (Karau & Williams, 1993). In general, larger groups tend to experience more challenges in their ability to effectively coordinate and be motivated. As groups grow larger, a fewer number of people end up contributing toward group discussions and individuals become less engaged as they feel that their contributions are less instrumental. Accordingly, in larger group settings, challenges associated with decreased coordination and lowered individual motivation tend to make it more difficult for groups to achieve their potential.

With that said, the basis of the literature on the negative effect of group size on motivation and coordination has largely been based off of ad-hoc groups of non-friends or strangers. Given that groups of friends are anticipated to experience heightened levels of motivation, and are anticipated to communicate better than non-friends, increased group size may not hamper their performance the way it does to groups of non-friends. Moreover, in larger groups where members are all friends with one another, the positive effects of friendship, relative to when people work with non-friends, may even be exacerbated.

Although there are arguments about whether a dyad should be included or excluded in group's research (Moreland, Hogg, & Hain, 1994; Williams, 2010), I included dyadic groups in the study. There are important effects that emerge in both larger groups and dyadic groups, and some of the fundamental work on motivation and communication in groups has been documented in dyads (see Williams, 2010). That said, some basic group processes can become more difficult to manage as groups get larger. This means that comparing both group structures (i.e., larger groups vs. dyads) in the study allows one to examine the effects of friendship on group performance at different sized groups. Specifically, I hypothesized:

Hypothesis 4: Group size will moderate the effect of friends on group task performance, such that the positive relationship will be stronger for larger groups as compared to smaller (i.e. dyadic) groups.

Figure 2. Summary of Hypotheses and Conceptual Framework

Exploratory Moderators of Group Performance

In addition to interdependence, task focus, and group size, I also sought to examine whether other task characteristics (e.g., cognitive tasks versus non cognitive tasks) and population (e.g., children versus adults) may moderate the relationship between friendship and group performance. In terms of task characteristics, groups may be asked to execute tasks requiring more physical or cognitive skills Scholars have

recognized the importance of examining the nature and characteristics of the tasks being performed (Hackman & Morris, 1975; Straus & McGrath, 1994). Given this, it seemed necessary to conduct further exploratory analyses examining the effect task characteristics. It is currently unclear how cognitive tasks will influence the relationship between friends and group performance. On the one hand, cognitive tasks may heighten the positive effect of friends on group performance because friends should feel more comfortable engaging in cognitive activities such as problem solving (e.g., Azmita & Montgomery, 1993) or memory retrieval tasks (e.g., Andersson, 2001) as compared to non-friends. On the other hand, cognitive tasks may attenuate the positive effect of friends on group performance because friends tend to be less comfortable engaging in effective reasoning techniques when completing problem solving tasks (e.g., Swenson & Strough, 2008).

Furthermore, population (i.e., children vs. adults), or the age of the friends, is another potential moderator that warrants further examination. It is possible that children are more comfortable in their friendships as compared to adults, because they tend to meet more frequently during school with one another. For example, performing tasks as a group may be a more positive experience for children than adults, in part due to the tendency for children to collaborate more often (Miell & MacDonald, 2000; Newcomb & Brady, 1982). Moreover, children may have an increased aversion towards working with strangers or non-friends as compared to adults (Greenberg & Marvin, 1982). On the other

hand, one may anticipate that children may make friends much quicker than adults, and that a few minutes/moments of meeting another who is similar in age may create a sense of closeness towards that person, as compared to the experience of two adults meeting one another for the first time (Ladd, 1990). As such, it is an open question for what, if any, impact participant age (children versus adults) might have on the relationship between friendship and group performance.

Methods

Literature Search and Sample of Studies

To test my hypotheses detailed in my model, I sought to conduct a meta-analysis (Lipsey & Wilson, 2001). To acquire articles for possible inclusion, I searched for empirical studies examining the effect of friends (versus non-friends) on group task performance. Specifically, I searched various online databases (ABI/Inform, Business Source Complete, ERIC, JSTOR, PsycINFO, Science Direct, Web of Science, Wiley Online Library) in social sciences literatures. I used a combination of various keywords in my search, such as “friends*”, “friendship*”, “team/group task performance”, “team performance*”, “friend/acquaintance”, and “friend/stranger.” I also searched for articles related to structural ties (e.g., cohesion, affective ties, density, intimacy, familiarity) along with group size (e.g., “dyads” and “group/team”). Secondly, I searched for articles published in top management journals (i.e., *Academy of Management Journal*, *Administrative Science Quarterly*, *Journal of Applied Psychology*, *Journal of Experimental Social Psychology*, *Journal of International Business Studies*, *Journal of Management*, *Journal of Organizational Behavior*, *Journal of Personality and Social Psychology*, *Organization Science*, *Organizational Behavior and Human Decision Processes*, *Psychological Bulletin* and *Personnel Psychology*) to identify studies to include in my analyses.. I also searched for articles published in other domains, such as

Child Development and Psychology in the Schools, given the relevance of my research question to current research on friends in the classroom. Lastly, I searched lists of references on existing published papers that focus on the relationship between friendship and group performance and friendship in children's classrooms.

Inclusion Criteria for Studies

There are several criteria to warrant inclusion in analyses. First, we focused only on lab experiments employing participants who were already established friends. Most studies recruit friend pairs or ask participants to bring best friends to join them in the study. I excluded several studies where subjects were not friends, but rather partners in a cohesive group (Zaccaro & McCoy, 2006; Zaccaro & Lowe, 1988), married or romantic couples (Wegner, Erber & Raymond, 1991) and studies where friendship was manipulated via scenario-methodology (Perry-Smith, 2014). In other words, only studies where friends have an existing natural friendship are included.

Second, only studies that provided a measure of a group's task performance were included. Group outcomes refer to either an outcome from an interdependent group task or the sum of individual outcomes as reported in the experiments. Studies examining other job related outcomes (i.e., satisfaction [Morrison, 2004; Mendelson & Kay, 2003; Riordan & Griffith, 1995], job involvement [Berndt & Keefe, 1995; Birch & Billman, 1986], cooperation [Hanham & McCormick, 2008] and fairness [Pataki, Sharpiro &

Clark, 1994; Austin, 1980]) were excluded, leaving group performance as the focus in the current paper.

After applying these criteria, I had 23 papers whereby I was able to obtain 25 independent effect sizes which were included for coding. However, based upon initial analyses, one study was deemed an outlier and was excluded (Macdonald, Miell & Morgan, 2000). The calculated effect size was more than 3 standard deviations away from the mean effect size across all other studies. Detection of outliers in meta-analytic data is important due to the fact outliers can bias the overall effect size, leading to false conclusions in the study (Huffcutt & Arthur, 1995). Huffcutt & Arthur (1995)'s sample-adjusted meta-analytic deviance statistic confirmed the above outlier. Altogether, the final sample includes 924 teams, with 24 independent effect sizes¹.

Coding of Study Characteristics

Following steps suggested by Lipsey & Wilson (2001), a coding scheme was developed to code relevant study features and moderators. For each study, we coded: 1) study characteristics (e.g., date of publication, number of subjects in the study, etc), 2)

¹ Rosenthal (1979) introduced 'failsafe N', which analyze 'file drawer' problem. The file drawer analysis refers to an estimate of the number of non-significant articles remaining in researchers' file drawers. Although it is conceptually attractive and relatively simple to use of meta-analysis, the usage of Rosenthal's failsafe N method is decreasing because the method is prone to misinterpretation and misuse and no statistical criterion is available for interpretation of its values (Rothstein, Sutton and Borenstein, 2005).

group features and characteristics (e.g., group size), and 3) experimental settings and conditions (e.g., level of task interdependence).

To determine group task performance, coders assessed whether it was quantity-based (e.g., Andersson, 2001; Andersson & Ronnberg, 1995) or quality-based (e.g., Kutnick & Kington, 2005; Gruenfeld, Mannix, Williams & Neale, 1996). When an experiment included multiple performance outcome variables, we randomly selected and coded a single effect size from the study to avoid violating non-independence of data as suggested by Lipsey and Wilson (2001). Two graduate student raters each coded the studies across multiple characteristics. Each individual coder read through the papers independently, and then coded papers based on the established coding scheme. However, they did not discuss the studies before they rated them because discussion may lead to biases in inter-rater agreement. Coding indicated a high rate of agreement. In the rare instances when the coders disagreed on a code, they discussed discrepancies to resolve any differences (Kong, Dirks & Ferrin, 2014). If consensus was still not reached, a third independent researcher joined the discussion until an agreement was reached. I calculated Cohen (1968)'s Kappa to assess inter-rater reliability of coding variables. Cohen's Kappa = 92.1 percent, which indicates a high degree inter-rater agreement (Landis & Koch, 1977).

Computation of Effect Sizes

According to Lipsey and Wilson (2001), there are three types of effect size statistics, specifically: (a) the mean differences, (b) the proportion differences, and (c) the odds ratio. The mean differences approach is most common. This approach compares the means of outcome measures for experimental and control groups (Lipsey & Wilson, 2001). Effect sizes are calculated by comparing the performance between a friend's group (i.e. treatment group) and a non-friend's group (i.e. control group). However, effect sizes using the unstandardized mean differences approach are biased due to the small sample sizes that lack reliability in measurement from each study. Therefore, I computed Cohen's d (Cohen, 2013) as an overall effect size from each study and then converted it to a standardized mean difference of effect sizes. In other words, this is the corrected or unbiased effect size (Hunter & Schmidt, 1990; Lipsey & Wilson, 2001). The standardized mean differences were derived by the pooled standard deviation to adjust sample bias (Hedges & Olkin, 1985). These procedures minimize upward biases of effect sizes when sample sizes are small and remove the small sample size bias correction. Thus, I used unbiased (i.e. standardized) mean differences effect sizes and derived weighted mean effect sizes from the inverse variance weight calculations (Hedges & Olkin, 1985). The inverse variance weight gives more weight to effect sizes that are more reliably estimated (Lipsey & Wilson, 2001).

Analysis of Effect Sizes

To test for an overall effect of friendship on group performance, I used a random effects model, which assumes that the excess variability across effect sizes derives from random differences across studies (Lipsey & Wilson, 2001; Hedges & Vevea, 1998). This approach allows one to better generalize findings to studies with subjects and measures that are different from those included in the sample of studies (Hedges & Vevea, 1998). Also, a random effects model derives a balanced and conservative overall effect size. Therefore, a study with a larger sample size will lose influence and a study with a smaller sample will gain influence based on relative weights. As suggested by Hedge & Olkin (1985), a homogeneity Q statistic was also conducted to test the homogeneous distribution of the effect sizes.

I then conducted detailed moderator analyses to check if the effect sizes have a high degree of variability. I used a fixed effect categorical model on moderator analyses, analogous to an analysis of variance (ANOVA), to examine the significance of potential categorical variables (Lipsey & Wilson, 2001). The fixed-effect model tests for a significance of a between-group variance statistic (Q_b), which provides support for the existence of moderators (i.e. a moderating effect), and it captures if the mean effect size across groups differ. A significant Q_w statistic indicates a within-group homogeneity of effect sizes in ANOVA, and also indicates the appropriateness of the categorical variable to fully explain the heterogeneity among the effect sizes (Lipsey & Wilson, 2001).

Results

Main Effects: Friendship and Group Task Performance

Table 1 presents results for both the overall main effect and moderator analyses.

Overall friendship effects on group performance

The effect of friendship on group performance was significant and positive ($d=0.45$; $k=24$; 95% confidence intervals, [0.21, 0.69]) indicating that groups with friends performed better than groups with non-friends, supporting Hypothesis 1.

Heterogeneity of Effect Sizes

Table 1 also indicates a significant heterogeneity among effect sizes ($Q = 75.17$; $p<0.001$), indicating that effect sizes vary across studies suggesting that it is likely that there are moderators of the main effect (Lipsey & Wilson, 2001; Hedges & Olkin, 1985).

Task Moderator Analyses

Summary of Moderator Analyses

Task interdependence was found to significantly moderate the effect of friendship on group task performance ($Q_b = 6.60$, $p=.010$), Hypothesis 2. Although friends performed better than non-friends on high interdependent tasks, ($d=0.26$; $k=15$; 95% CI=[0.10,0.43]; $Q_w=38.00$, $p<0.001$) the discrepancy was even larger for low

interdependence tasks ($d=0.63$; $k=9$; 95% CI=[0.41,0.86]; $Q_w=30.57$, $p<0.001$). Thus, although task interdependence did moderate the relationship between friendship and task performance, this difference was from a stronger benefit of working with friends on low interdependent tasks, rather than a pronounced benefit from working on high interdependent tasks.

When comparing three types of task focus (maximizing [$d=0.83$; $k=10$; 95% CI=[0.61,1.05]; $Q_w=24.48$, $p=.004$], optimizing [$d=0.09$; $k=7$; 95% CI=[-0.13,0.31]; $Q_w=17.10$, $p=.009$] and mixed/unclear [$d=0.20$; $k=7$; 95% CI=[-0.06,0.45]; $Q_w=8.80$, $p=.185$]), results reveal a significant overall effect ($Q_b = 24.79$, $p<0.001$), indicating that friends perform better when focused on a maximizing task as compared to other tasks (i.e., optimizing or mixed tasks).

Although in the predicted direction, group size did not significantly moderate the effect of friends on group performance ($Q_b = 1.32$, $p=.250$). Therefore, Hypothesis 4 was not supported. Friends performed better than non-friends in both larger groups ($d=0.50$; $k=8$; 95% CI=[0.27,0.73]; $Q_w=47.32$, $p<0.001$) and in dyads ($d=0.34$; $k=16$; 95% CI=[0.17,0.50]; $Q_w=26.53$, $p=.033$).

TABLE 1
Effects of Friendship on Group Performance with Between and Within-
Homogeneity Tests across Moderating Variables

Moderating Variables	k	ES(d)	CI 95%	Homogeneity tests	
				Q(b)	Q(w)
Overall	24	0.45	0.21	0.69	75.17***
Task interdependence					6.60*
High	15	0.26	0.10	0.43	38.00***
Low	9	0.63	0.41	0.86	30.57***
Task focus/emphasis					24.79***
Maximizing	10	0.83	0.61	1.05	24.48**
Optimizing	7	0.09	-0.13	0.31	17.10**
Mixed/Unclear	7	0.20	-0.06	0.45	8.80
Group size					1.32
Dyads	16	0.34	0.17	0.50	26.53*
Over 3 people	8	0.50	0.27	0.73	47.32***

* $p < .05$

** $p < .01$

*** $p < .001$

Note: k indicates the number of independent samples. CI refers to confidence interval in 95%.

Exploratory Analyses

Friends performed significantly higher when working on a physical task ($d=0.90$; $k=5$; 95% CI=[0.58,1.22]; $Q_w=18.39$, $p<.001$) as compared to a cognitive task ($d=0.30$; $k=19$; 95% CI=[0.14,0.44]; $Q_w=45.40$, $p<.001$) (see Table 2), indicating that task

characteristics significantly moderates the effect of friends on group performance ($Q_b=11.38, p<.001$).

TABLE 2
Summary of Explorative Moderator Analyses

Moderating Variables	k	ES(d)	CI 95%		Homogeneity tests	
					Q(b)	Q(w)
Task characteristics					11.38***	
Physical	5	0.90	0.58	1.22		18.39***
Cognitive	19	0.30	0.14	0.44		45.40***
Age composition					0.07	
Children	8	0.42	0.19	0.64		20.77**
Adults	16	0.38	0.21	0.55		54.33***

* $p<.05$
 ** $p<.01$
 *** $p<.001$

Note: k indicates the number of independent samples. CI refers to confidence interval in 95%.

Age composition did not significantly moderate the effect of friends on group performance ($Q_b=0.07, p=.80$). In both groups composed of children ($d=0.42; k=8$; 95% CI=[0.19,0.64]; $Q_w=20.77, p<.001$) and adults ($d=0.38; k=16$; 95% CI=[0.21,0.55]; $Q_w=54.33, p<.001$) (see Table 2), results indicate that friends perform significantly than non-friends.

Discussion and Conclusion

Theoretical Implications for Friendship Research

Previous research investigating the effect of friendship on group performance has mostly been correlational, making it difficult to identify a clear effect of friends on group performance. Furthermore, lab studies have provided mixed results on the effect of friendship on group task performance. In other words, friends in the same work group may increase (e.g., Anderson & Ronnberg, 1997; Karau and Williams; 1997) or decrease (e.g., Peker & Tekcan, 2009) group task performance. My thesis seeks to reconcile these mixed findings by reviewing relevant literature on friendship and group processes, by developing a model of the effect of friendship on group performance, and by conducting a meta-analysis.

After reviewing several studies examining the link between friendship and group performance, I compare and contrast their conceptualization of friendship. Previous studies have various conceptualizations of friendships (e.g., acquaintances, strong ties) and categorize friendship in different ways. With a collection of friendship-like (e.g., close and intimate) relationships, I develop a continuum of intimacy and re-categorize friendships (vs. non-friends) in the context of groups.

Mixed results of the link between friendship and group performance may be explained by specific mechanisms by which friendship leads to group task performance.

Thus, I develop a process model of friendship on group task performance based on the *Input-Process-Output framework* (i.e. IPO framework; Ilgen, Hollenbeck, Johnson & Jundt, 2005; Guzzo & Shea, 1992; Hackman, 1983) and Steiner's (1972) processes (e.g., motivation and coordination) approach. I propose that friends are more likely to be motivated and will better coordinate than non-friends. This is because friendship increases group members' emotional attachment and trust towards the group they are in (i.e. commitment). Additionally, friendship increases coordination in groups because friends are more familiar with each other, as they are more aware of the similarities and differences of their friends as compared to non-friends. Such increased familiarity has been shown to promote more effective communication towards one another (Harrison, Mohammed, McGrath, Florey, & Vanderstoep, 2003).

Further, to test the idea of when friendship matters more for group task performance, I conceptualize three main situational factors that may affect the positive association between friendship and group task performance: task interdependence, task focus/emphasis, and group size. Whereas task focus moderates the effect of friendship on group task performance in the expected direction, task interdependence shows a different pattern of results than my theory would suggest.

To test the newly developed conceptual model of friendship on group task performance, I apply a meta-analytic technique. In addition to the unclear conceptual link between friendship and group performance, indeed various sample sizes and study

environments could be other sources of these mixed results. One advantage of meta-analyses is that they produce high statistical power by combining multiple studies testing the link between variables of interest and weighting each effect size by the inverse of its variance with sample sizes (Lipsey & Wilson, 2001). Moreover, I only selected studies employing laboratory methodology because these studies often rule out alternative explanations for the effect of friendship on group task performance.

As expected, meta-analytic results reveal that friendship has a positive effect on group task performance, indicating that working with friends can be beneficial for group performance, as compared to working with non-friends. Mixed results were integrated into the positive outcome based on mean effect sizes, weighting on different size of samples. Therefore, this finding suggest that other future research can be conducted to investigate which group compositions (e.g., gender, age, culture) can influence performance outcomes under different contexts. These approaches could contribute to the development of new theoretical models incorporating the diversity of groups or organizations.

Moderating effects

In terms of moderation analysis, results indicate that task characteristics (e.g., task interdependence, task focus) moderate the effect of friendship on group task performance. First, I hypothesized that task interdependence will heighten the positive effect of

friendship on group task performance due to more frequent interaction. However, contrary to what I expected on Hypothesis 2, results revealed that the difference between friends and non-friends was larger when working on tasks with low interdependence as comparing friends vs. non-friends on tasks with high interdependence. This finding is interesting because it may suggest that when working on highly interdependent tasks, friends may spend more time socializing, rather than concentrating on the task. In addition, it is possible that the coordination or motivation benefits accrued from friendships do not emerge in highly interdependent tasks as the nature of these tasks may require non-friends to frequently interact with one-another, resulting in high commitment to their relationships and enhanced motivation (Lawler & Yoon, 1996).

Moderation results also indicated that task focus affected the relationship between friendship on group task performance such that friends performed better when working on maximizing tasks as opposed to optimizing tasks. Motivation increases when individuals have high expectations that they will achieve goals (Vroom, 1964). Since maximizing tasks have clear criteria for achieving goals, it is more likely that friends are more motivated to achieve their goals than non-friend groups. These results support the conceptual model in which I theorize motivation as a key mediating mechanism for the positive relationship between friendship and group performance.

Hypothesis 4 was not supported, as group size did not significantly moderate the effect of friendship on group task performance as friends performed better when working

in both a dyad and a larger group. Although there was a trend to support the proposed relationship between group size and performance, the difference did not reach statistical significance, indicating that friendship did not have unique effects on performance as a function of group size.

Taken together, meta-analytic results confirm that working with friends has a positive effect on group task performance as compared to working with non-friends. Analyses supported two key situational factors proposed in my model which moderate the positive effect of friends on task performance. Thus, this thesis helps to explain when and how working with friends leads to better group task performance. The meta-analytic results of the current study provide robustness to current research and help to integrate previous studies by reducing sampling error of individual studies (Schmidt, 1992).

Limitations and Future Directions

Despite theoretical contributions discussed in previous section, the current study is not without some limitations. One limitation of this study is the relatively low number of aggregated independent studies (i.e. independent effect sizes) and the small sample sizes in several of the studies. While an inclusion of more studies within a meta-analysis may broaden the implications of the work and allow for more generalizability, the current study includes 24 independent studies which may be considered a modest number of studies. In addition, some of the studies included in the meta-analysis contain relatively

small sample sizes, generating some concerns that the effect size index may be upwardly biased (Hedges, 1981; Lipsey & Wilson, 2001). Small sample sizes may be associated with sampling error, affecting the generalizability of the results within my meta-analysis.

Secondly, the current study focuses only on task performance, but does not shed light on other relevant group outcomes. While focusing the current research on group task performance provides a theoretical and empirical foundation for the implications of friendship within groups, there are other team outcomes (Kozlowski & Bell, 2003) which may be affected by working on friendship teams. For instance, it is likely that friendship could affect satisfaction (Winstead, Derlega, Montgomery & Pilkington, 2005), intention to leave (Morrison, 2004; Riordan & Griffeth, 1995) and equality (Pataki, Shapiro & Clark, 1994), and thus should be considered in the future. I would propose that future research investigates how other contextual moderators may enhance the strength and direction of other team outcomes mentioned above.

Third, as all the samples were based upon laboratory experiments, caution should be expressed prior to extending these findings to organizational settings. Future research in the workplace could shed valuable light on how friendship impacts team performance and processes by comparing working with friends and non-friends. That said, organizational research would also benefit from a longitudinal perspective as new coworkers may become friends with their teammates over time, allowing an important

opportunity to examine if this psychological shift in the relationship has marked benefits for group performance as well.

As such, future work would benefit from taking into account how the role of time in a friendship may affect group task performance. In organizations, for example, two co-workers, who barely know each other, build relationships and become close friends over time by interacting frequently for team tasks or projects that they are involved. Relationship quality between the two coworkers differs by the stage of their relationships, which may influence the friendship effect on group task performance (Harrison, Mohammed, McGrath, & Vanderstoep, 2003). However, all study samples collected in this meta-analysis only include friends who were involved with one another before the start of the study. It would be interesting for future research to examine relational processes of how friends develop over time and whether newly formed friends differ in their performance relative to long-term friends. The longitudinal setting of friendship (e.g., Harrison, Mohammed, McGrath, Florey, & Vanderstoep, 2003) may also be important to consider in the future to seek how longevity will improve or exacerbate some of the effects of friendship on group performance.

Finally, many of the studies were conducted in Western countries (e.g., U.S or Europe), making it difficult to know to what degree these effects would extend across other cultures. For example, the effects of certain diversity attributes (e.g., Hofstede's (1984) collective versus individualistic index) may be more influenced in some cultures

and negligible in other cultures. Thus, future research should consider the effects of friendship on group task performance in different cultural contexts and seek to insight into the role of culture to broaden our understanding if the positive effects of friendship on performance extend to other cultures.

Conclusion

In conclusion, this meta-analytical review identifies that working with friends can result in higher group performance as compared to working with non-friends. In this study, I synthesized and integrated past research reporting mixed evidence for the effects of friendship. I reconcile these mixed findings by offering a new framework for the friendship and group performance and identify several possible moderators for this effect. This research should facilitate future research on friendship and set the stage for new theoretical developments within this area.

References

*** Studies marked with an asterisk were included in the meta-analysis**

Adams, R. G., & Blieszner, R. (1994). An integrative conceptual framework for friendship research. *Journal of Social and Personal Relationships*, 11(2), 163-184.

* Andersson, J. (2001). Net effect of memory collaboration: How is collaboration affected by factors such as friendship, gender and age?. *Scandinavian journal of Psychology*, 42(4), 367-375.

* Andersson, J., & Rönnerberg, J. (1995). Recall suffers from collaboration: Joint recall effects of friendship and task complexity. *Applied Cognitive Psychology*, 9(3), 199-211.

* Andersson, J., & Rönnerberg, J. (1996). Collaboration and memory: Effects of dyadic retrieval on different memory tasks. *Applied Cognitive Psychology*, 10(2), 171-181.

* Andersson, J., & Rönnerberg, J. (1997). Cued memory collaboration: Effects of friendship and type of retrieval cue. *European Journal of Cognitive Psychology*, 9(3), 273-287.

Aron, E. N., & Aron, A. (1997). Sensory-processing sensitivity and its relation to introversion and emotionality. *Journal of personality and social psychology*, 73(2), 345.

Austin, W. (1980). Friendship and fairness effects of type of relationship and task performance on choice of distribution rules. *Personality and Social Psychology Bulletin*, 6(3), 402-408.

*Azmitia, M., & Montgomery, R. (1993). Friendship, transactive dialogues, and the development of scientific reasoning. *Social development*, 2(3), 202-221.

Baron, R. S., Kerr, N. L. (2003). *Group process, group decision, group action*. Open University Press.

Berndt, T. J., & Keefe, K. (1995). Friends' influence on adolescents' adjustment to school. *Child development*, 66(5), 1312-1329.

Berscheid, E., & Reis, H. T. (1998). Attraction and close relationships. *The handbook of social psychology*, 2, 193-281.

Birch, L. L., & Billman, J. (1986). Preschool children's food sharing with friends and acquaintances. *Child Development*, 387-395.

*Bos, N. D., Buyuktur, A., Olson, J. S., Olson, G. M., & Volda, A. (2010, November). Shared identity helps partially distributed teams, but distance still matters. *In Proceedings of the 16th ACM international conference on Supporting group work* (pp. 89-96). ACM.

Bray, R. M., Kerr, N. L., & Atkin, R. S. (1978). Effects of group size, problem difficulty, and sex on group performance and member reactions. *Journal of Personality and Social Psychology*, 36(11), 1224.

Brewer, M. B. (1979). In-group bias in the minimal intergroup situation: A cognitive-motivational analysis. *Psychological bulletin*, 86(2), 307.

- Byrne, D. E. (1971). *The attraction paradigm* (Vol. 11). Academic Press.
- Clark, M. S., & Mills, J. (1979). Interpersonal attraction in exchange and communal relationships. *Journal of personality and social psychology*, 37(1), 12.
- Cohen, J. (1968). Weighted kappa: Nominal scale agreement provision for scaled disagreement or partial credit. *Psychological bulletin*, 70(4), 213.
- Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Academic press.
- Evans, C. R., & Dion, K. L. (1991). Group cohesion and performance a meta-analysis. *Small group research*, 22(2), 175-186.
- Foot, H., & Barron, A. M. (1990). Friendship and task management in children's peer tutoring. *Educational Studies*, 16(3), 237-250.
- Galbraith, J. R. (1973). *Designing complex organizations*. Addison-Wesley Longman Publishing Co., Inc.
- Greenberg, M. T., & Marvin, R. S. (1982). Reactions of preschool children to an adult stranger: A behavioral systems approach. *Child Development*, 481-490.
- *Gruenfeld, D. H., Mannix, E. A., Williams, K. Y., & Neale, M. A. (1996). Group composition and decision making: How member familiarity and information distribution affect process and performance. *Organizational behavior and human decision processes*, 67(1), 1-15.
- Guzzo, R. A., & Shea, G. P. (1992). Group performance and intergroup relations in organizations. *Handbook of industrial and organizational psychology*, 3, 269-313.

- Hackman, J. R. (1983). *A normative model of work team effectiveness* (No. TR-2). Office of Naval Research Arlington, VA.
- Hackman, J. R., & Wageman, R. (2005). A theory of team coaching. *Academy of Management Review*, 30(2), 269-287.
- Hackman, J. R., & Morris, C.G., (1975). *Group tasks, group interaction process, and group performance effectiveness: A review and proposed integration*. L. Berkowitz (Ed.), *Advances in experimental social psychology*, Vol. 8. Academic Press, New York
- Hackman, J. R., & Vidmar, N. (1970). Effects of size and task type on group performance and member reactions. *Sociometry*, 37-54.
- Halpern, A. S. (1994). The transition of youth with disabilities to adult life: A position statement of the Division on Career Development and Transition, The Council for Exceptional Children. *Career Development for Exceptional Individuals*, 17,115–124
- Hanham, J., & McCormick, J. M. (2008). Relationships between self-processes and group processes with friends and acquaintances.
- *Harrison, D. A., Mohammed, S., McGrath, J. E., Florey, A. T., & Vanderstoep, S. W. (2003). Time matters in team performance: Effects of member familiarity, entrainment, and task discontinuity on speed and quality. *Personnel Psychology*, 56(3), 633-669.
- Hedges, L. V. (1981). Distribution theory for Glass's estimator of effect size and related estimators. *Journal of Educational and Behavioral Statistics*, 6(2), 107-128.
- Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. Academic press.

- Hedges, L. V., & Vevea, J. L. (1998). Fixed-and random-effects models in meta-analysis. *Psychological methods*, 3(4), 486.
- Hofstede, G. (1984). Cultural dimensions in management and planning. *Asia Pacific journal of management*, 1(2), 81-99.
- *Hope, L., Ost, J., Gabbert, F., Healey, S., & Lenton, E. (2008). "With a little help from my friends...": The role of co-witness relationship in susceptibility to misinformation. *Acta Psychologica*, 127(2), 476-484.
- Huffcutt, A. I., & Arthur, W. (1995). Development of a new outlier statistic for meta-analytic data. *Journal of Applied Psychology*, 80(2), 327.
- Hunter, J. E., & Schmidt, F. L. (1990). Dichotomization of continuous variables: The implications for meta-analysis. *Journal of Applied Psychology*, 75(3), 334.
- Ilgen, D. R., Hollenbeck, J. R., Johnson, M., & Jundt, D. (2005). Teams in organizations: From input-process-output models to IMOI models. *Annual Review of Psychology*, 56, 517-543.
- Jehn, K. A., & Mannix, E. A. (2001). The dynamic nature of conflict: A longitudinal study of intragroup conflict and group performance. *Academy of management journal*, 44(2), 238-251.
- *Jehn, K. A., & Shah, P. P. (1997). Interpersonal relationships and task performance: An examination of mediation processes in friendship and acquaintance groups. *Journal of Personality and Social Psychology*, 72(4), 775.
- Joshi, A., & Roh, H. (2009). The role of context in work team diversity research: A meta-analytic review. *Academy of Management Journal*, 52(3), 599-627.

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

*Karau, S. J., & Williams, K. D. (1997). The effects of group cohesiveness on social loafing and social compensation. *Group Dynamics: Theory, Research, and Practice*, 1(2), 156.

Kelly, J. R., & McGrath, J. E. (1985). Effects of time limits and task types on task performance and interaction of four-person groups. *Journal of Personality and Social Psychology*, 49(2), 395.

Kerr, N. L. (1983). Motivation losses in small groups: A social dilemma analysis. *Journal of Personality and Social Psychology*, 45(4), 819.

*Kerr, N. L., & Seok, D. H. (2011). "... with a little help from my friends": friendship, effort norms, and group motivation gain. *Journal of Managerial Psychology*, 26(3), 205-218.

Klein, H. J., Molloy, J. C., & Brinsfield, C. T. (2012). Reconceptualizing workplace commitment to redress a stretched construct: Revisiting assumptions and removing confounds. *Academy of Management Review*, 37(1), 130-151.

Klein, H. J., & Mulvey, P. W. (1995). Two investigations of the relationships among group goals, goal commitment, cohesion, and performance. *Organizational Behavior and Human Decision Processes*, 61(1), 44-53.

Kong, D. T., Dirks, K., & Ferrin, D. (2013). Interpersonal trust within negotiations: Meta-analytic evidence, critical contingencies, and directions for future research. *Academy of Management Journal*, amj-2012.

- Kozlowski, S. W., & Bell, B. S. (2003). Work groups and teams in organizations. *Handbook of psychology*.
- Krackhardt, D. (1992). The strength of strong ties: The importance of philos in organizations. *Networks and organizations: Structure, form, and action*, 216, 239.
- *Kutnick, P., & Kington, A. (2005). Children's friendships and learning in school: Cognitive enhancement through social interaction?. *British journal of educational psychology*, 75(4), 521-538.
- Ladd, G. W. (1990). Having friends, keeping friends, making friends, and being liked by peers in the classroom: Predictors of children's early school adjustment?. *Child development*, 61(4), 1081-1100.
- Ladd, G. W., & Emerson, E. S. (1984). Shared knowledge in children's friendships. *Developmental Psychology*, 20(5), 932.
- Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 159-174.
- Latané, B., Williams, K., & Harkins, S. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of personality and social psychology*, 37(6), 822.
- Laughlin, P. R. (2011). *Group problem solving*. Princeton University Press.
- Lawler, E. J., & Yoon, J. (1996). Commitment in exchange relations: Test of a theory of relational cohesion. *American sociological review*, 89-108.

Lawrence, P. R., Lorsch, J. W., & Garrison, J. S. (1967). *Organization and environment: Managing differentiation and integration* (p. 1976). Boston, MA: Division of Research, Graduate School of Business Administration, Harvard University.

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis* (Vol. 49). Thousand Oaks, CA: Sage publications.

*Macdonald, R. A., Miell, D., & Mitchell, L. (2002). An investigation of children's musical collaborations: The effect of friendship and age. *Psychology of Music*, 30(2), 148-163.

MacDonald, R., Miell, D., & Morgan, L. (2000). Social processes and creative collaboration in children. *European Journal of Psychology of Education*, 15(4), 405-415.

Mehra, A., Kilduff, M., & Brass, D. J. (2001). The social networks of high and low self-monitors: Implications for workplace performance. *Administrative science quarterly*, 46(1), 121-146.

Mendelson, M. J., & Kay, A. C. (2003). Positive feelings in friendship: Does imbalance in the relationship matter?. *Journal of Social and Personal Relationships*, 20(1), 101-116.

*Miell, D., & MacDonald, R. (2000). Children's creative collaborations: The importance of friendship when working together on a musical composition. *Social Development*, 9(3), 348-369.

Moreland, R. L., Hogg, M. A., & Hains, S. C. (1994). Back to the future: Social psychological research on groups. *Journal of Experimental Social Psychology*, 30(6), 527-555.

- Morrison, E. W. (2002). Newcomers' relationships: The role of social network ties during socialization. *Academy of management Journal*, 45(6), 1149-1160.
- Morrison, R. (2004). Informal Relationships in the Workplace: Associations with job satisfaction, organizational commitment and turnover intentions. *New Zealand journal of psychology*, 33(3).
- Newcomb, A. F., & Bagwell, C. L. (1995). Children's friendship relations: A meta-analytic review. *Psychological bulletin*, 117(2), 306.
- *Newcomb, A. F., & Brady, J. E. (1982). Mutuality in boys' friendship relations. *Child Development*, 392-395.
- *Nibler, R., & Harris, K. L. (2003). The effects of culture and cohesiveness on intragroup conflict and effectiveness. *The Journal of social psychology*, 143(5), 613-631.
- Nijstad, B. A. (2009). *Group performance*. Psychology Press.
- Pataki, S. P., Shapiro, C., & Clark, M. S. (1994). Children's acquisition of appropriate norms for friendships and acquaintances. *Journal of Social and Personal Relationships*, 11(3), 427-442.
- *Peker, M., & Tekcan, A. İ. (2009). The role of familiarity among group members in collaborative inhibition and social contagion. *Social Psychology*, 40(3), 111.
- Perry-Smith, J. E. (2014). Social network ties beyond nonredundancy: An experimental investigation of the effect of knowledge content and tie strength on creativity. *Journal of Applied Psychology*, 99(5), 831.

- Riordan, C. M., & Griffeth, R. W. (1995). The opportunity for friendship in the workplace: An underexplored construct. *Journal of business and psychology*, 10(2), 141-154.
- Ross, H. S., Cheyne, J. A., & Lollis, S. P. (1988). Defining and studying reciprocity in young children.
- Schmidt, F. L. (1992). What do data really mean? Research findings, meta-analysis, and cumulative knowledge in psychology. *American Psychologist*, 47(10), 1173.
- *Shah, P. P., & Jehn, K. A. (1993). Do friends perform better than acquaintances? The interaction of friendship, conflict, and task. *Group decision and negotiation*, 2(2), 149-165.
- *Sharabany, R., & Hertz-Lazarowitz, R. (1981). Do friends share and communicate more than non-friends?. *International Journal of Behavioral Development*, 4(1), 45-59.
- Simons, T. L., & Peterson, R. S. (2000). Task conflict and relationship conflict in top management teams: the pivotal role of intragroup trust. *Journal of applied psychology*, 85(1), 102.
- Steiner, I. D., (1972) *Group process and productivity*. Academic Press, New York
- Straus, S. G., & McGrath, J. E. (1994). Does the medium matter? The interaction of task type and technology on group performance and member reactions. *Journal of applied psychology*, 79(1), 87.
- Suttles, G. D. (1970). Friendship as a social institution. *Social relationships*, 95-135.

*Swenson, L. M., & Strough, J. (2008). Adolescents' collaboration in the classroom: Do peer relationships or gender matter?. *Psychology in the Schools*, 45(8), 715-728.

Tajfel, H., & Turner, J. C. (1986). The Social Identity Theory of Intergroup Behavior. S. Worchel, W. Austin (Eds.), *Psychology of intergroup relations*, Nelson-Hall, Chicago, IL, pp. 7-24

Tesser, A., Millar, M., & Moore, J. (1988). Some affective consequences of social comparison and reflection processes: The pain and pleasure of being close. *Journal of personality and social psychology*, 54(1), 49.

Thibaut, J. W., & Kelley, H. H. (1959). *The social psychology of groups*.

Thompson, J. D. (1967). *Organizations in action: Social science bases of administration*. NY: McGraw-Hill

Van de Ven, A. H., & Ferry, D. L. (1980). *Measuring and assessing organizations*. John Wiley & Sons.

*Volda, A., Bos, N., Olson, J., Olson, G., & Dunning, L. (2012, May). Cross-cutting faultlines of location and shared identity in the intergroup cooperation of partially distributed groups. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 3101-3110). ACM.

Vroom, V. H. (1964). Work and motivation. 1964. NY: John Wiley & sons, 47-51.

Wegner, D. M., Erber, R., & Raymond, P. (1991). Transactive memory in close relationships. *Journal of personality and social psychology*, 61(6), 923.

- Wheelan, S. A. (2009). Group size, group development, and group productivity. *Small Group Research*.
- Williams, K. D. (2010). Dyads can be groups (and often are). *Small Group Research*, 41(2), 268-274.
- Winstead, B. A., Derlega, V. J., Montgomery, M. J., & Pilkington, C. (1995). The quality of friendships at work and job satisfaction. *Journal of Social and Personal Relationships*, 12(2), 199-215.
- Wright, P. H. (1978). Toward a theory of friendship based on a conception of self. *Human Communication Research*, 4(3), 196-207.
- Zaccaro, S. J., & Lowe, C. A. (1988). Cohesiveness and performance on an additive task: Evidence for multidimensionality. *The Journal of Social Psychology*, 128(4), 547-558.
- Zaccaro, S. J., & McCoy, M. C. (2006). The Effects of Task and Interpersonal Cohesiveness on Performance of a Disjunctive Group Task. *Journal of applied social psychology*, 18(10), 837-851.