# TRANSPERSONAL EFFICACY

A Dissertation

Presented to the Faculty of the Graduate School

of Cornell University

in Partial Fulfillment of the Degree Requirements for the Degree of

Doctor of Philosophy

by

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May 2012

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# TRANSPERSONAL EFFICACY

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Cornell University 2012

In addition to self-efficacy, efficacy perceptions of others within a task environment influence task performance. I define such efficacy perceptions of single others as transpersonal efficacy and investigate it in five studies. The first shows transpersonal efficacy can drive performance. The second then investigates how self and transpersonal efficacy jointly influence task performance. Further, the role of the focal other within the task environment, as an outcome interdependent or non-interdependent partner, or as an opponent, is shown to moderate these relationships. Then, transpersonal efficacy is investigated in intact groups. Groups are omnipresent in modern organizations. However, deficiencies in the amount of effort members exert in group tasks, and the manner in which they exert that effort, prevent groups from optimizing the talent of their members. I draw on social cognitive theory to predict that the pattern of multiple interacting efficacy perceptions within a group environment regulate both the level and direction of within-group effort allocation. Further, I use expectancy theory to predict task interdependence as a moderator of whether these perceptions produce efficient effort allocations. Support for these propositions is found in two field studies involving basketball and project teams. Finally, instrumentality is investigated as a driver of within-group information exchange. Groups rarely utilize the unique knowledge of their members when making decisions. This tendency to neglect the expertise of group members severely limits the effectiveness of group decision making. The final study uses expectancy theory to investigate this issue, and to link motivation to information exchange in groups. Results indicate that expectancy motivation drives groups to utilize expertise awareness, exchange more unique information, and thus solve a hidden profile problem correctly. The results of all five studies are discussed in terms of the applicability of transpersonal efficacy to predicting individual behavior within and outside of group contexts. In addition, they are discussed in terms of the usefulness of viewing groups as collections of reciprocally interacting entities, as opposed to singular entities or collections of individuals.

## BIOGRAPHICAL SKETCH

Kyle J. Emich was born in Poughkeepsie, New York on March 17, 1984. He graduated from Spackenkill High School in 2002 as a varsity soccer and baseball player and a member of the National Thespian Society. He earned a summa cum laude Bachelor of Arts degree in psychology from the State University of New York College at Oswego in 2002. While there, he was a Resident Assistant for three years and received the Helen B. Daly Undergraduate Award for Excellence in Psychological Research for his projects investigating academic self-efficacy, the productivity of first-year assimilation programs, and gender effects. He also was a co-founder of the SUNY Oswego racquetball club and played second singles for three years. In August of the same year he began graduate studies in Organizational Behavior in the Industrial and Labor Relations School of Cornell University in Ithaca, New York under the supervision of Tove Hammer. Since then he has published three manuscripts, one each in *Human Performance*, *Personality and Social Psychology Bulletin*, and *Small Group Research*. Additionally, he has won best paper awards from both The Academy of Management and the Interdisciplinary Network for Group Research.

ACKNOWLEDGMENTS

I would like to express my great appreciation to my advisor, Dr. Tove Hammer, for supporting me through all of my theoretical and experimental brainstorming, giving me guidance through the data collection and writing phases of this project, and for instilling hope in me that I would be able to complete this project. I would also like to thank Brad Bell for being my minor committee chair and providing his insight into this project.

In addition I would like to thank Dr. Alice Isen, for her support throughout the writing of this dissertation. Although she could not be here to see the defense, her methodological rigor, creativity, and writing style helped to shape this manuscript. She will be remembered fondly.

I would also like to thank my parents, Rob and Gail Emich, for their enthusiastic support on this project and their help in analyzing the rough draft of this paper.

Lastly, I would like to thank my fiancée, Li Lu, for motivating me to work hard and for her patience in listening to my ideas. Additionally, her creative insight has helped to shape the future of this project. Her help and thoughts are greatly appreciated and this paper could not have made it to its current form without her.

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Imagine you have just been assigned to complete a task with a coworker. Your coworker is talented, highly motivated, and seems to perform well on any project assigned. You may be excited to work with such a knowledgeable and accomplished individual. However, what if your coworker's role changed so that he or she were your opponent? Moreover, what if the task structure changed so that only one of you could get credit for your team's performance, or so that you two were part of a larger group? In this paper I argue that your confidence in your coworker's abilities to complete the task successfully will affect your own task performance. In addition, I argue that changing the role of a focal other, or changing the structure of the task on which you are both working, will likely work in conjunction with your beliefs about your own ability to succeed at a task to influence your task performance. Research on self-efficacy, the judgment of one's ability to organize and execute a given course of action (Bandura, 1997), has shown that it is a strong predictor of performance (Stajkovic & Luthans, 1998). In addition to self-perceptions, however, factors outside the self can affect performance expectations (Eden, 2001; Eden et al., 2010). When entering a task environment people create performance expectations based on the stimuli in that environment, and then perform appropriately (Eden, 2001). In an interpersonal setting this expectation often depends on other individuals (Karau & Williams, 2001). Therefore, the beliefs one has about other people's task related abilities should have a significant impact on individual performance. I call these beliefs *transpersonal efficacy*, or one person's confidence in *another* person's capabilities to organize and execute the courses of action required to produce a given outcome.

While efficacy constructs currently exist at the individual and collective level (Bandura, 1997), this intermediate conceptualization focusing on single others within a task environment adds to the efficacy literature by creating an efficacy construct which is independent the self.

This is important because, although others are included in collective judgments, the self can overshadow perceived teammate contributions to collective outcomes (Baker, 2001; Gibson & Earley, 2007), making it difficult to isolate and thus interpret the effect of efficacy perceptions of specific others on motivational and performance outcomes. It is clear that self-efficacy, defined as the belief in one's capabilities to organize and execute the courses of action required to produce given outcomes (Bandura, 1997), focuses on the self (Bandura, 1997; Eden, 2001). However the self is also included in collective efficacy judgments, a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given outcomes (Bandura, 1997), since the self is part of any collective being judged. This is of import because individuals who exist outside of self-perceptions can still have significant effects on task motivation (e.g. Festinger, 1954). Thus, transpersonal efficacy increases the predictive validity of social cognitive theory by allowing it to encompass the totality of individuals present within a task environment, shown in Figure 1. Currently efficacy constructs only account for the unshaded regions. This differentiation allows for efficacy perceptions of others not present within a focal collective, such as managers (Lord & Brown, 2003) and opponents (Festinger, 1954), to be encompassed by social cognitive theory.

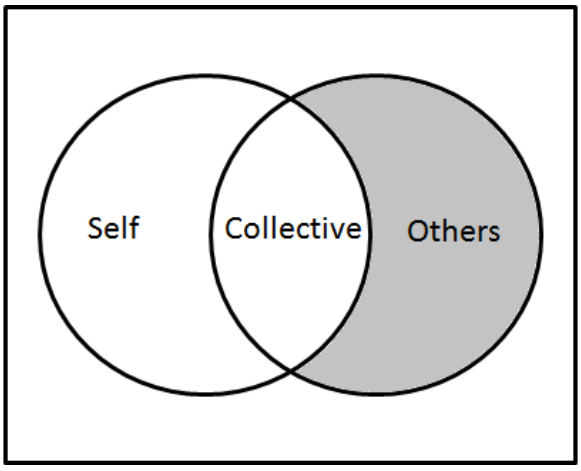

Figure 1. Those Who Relate to Performance Outcomes.

Further, by allowing investigation of dyadic efficacy perceptions in group environments, transpersonal efficacy allows for differentiation between groups with congruent self and collective efficacy beliefs. In an ideal situation, each group member will accurately perceive all other member's abilities and create group perceptions by equally weighting those abilities, including those of the self. In such scenarios, where collective efficacy is an emergent process built overtime through group interaction, groups will persevere longer in the face of adversity (Bandura, 1997; Gully, et al., 2002), set higher goals (Prussia & Kinicki, 1996), and be more effective (Gibson, 1999; Gibson, Randel & Earley, 2000). However, due to the aforementioned tendency to project self-perceptions on group characteristics (Baker, 2001; Gibson & Earley, 2007), this is not always the case. This tendency is evidenced in the significant positive relationship between self-efficacy and collective efficacy found in most studies which measure both variables (see Feltz & Lirgg, 1998; Lent, Schmidt & Schmidt, 2006; Magyar, Feltz & Simpson, 2004; Seijts, Latham & Whyte, 2000; Wang & Lin, 2008; Watson, Chemers & Presier, 2001). In such scenarios, where self and collective efficacy have similar valence, transpersonal efficacy allows for distinctions to be made between ideal effective groups and groups made of individuals with high self and collective efficacy, but low transpersonal efficacy. In other words, it allows researchers to distinguish between those forming group perceptions based on all members and those whose collective perceptions are clearly derived from their own high self-efficacy (Littlepage & Mueller, 1997). While these latter collections of self-proclaimed superstars may engender high individualized motivation, such collectives also decrease resource exchange between members (Larson, et al., 1998), and over time, may lead to feelings of isolation between members, ultimately resulting in decreased collective efficacy and defining the group completely in terms of its other members (Albanese & Van Fleet, 1985; Kerr & Bruun,

1983). Therefore, transpersonal efficacy helps to differentiate between three explanations of congruent self and collective efficacy perceptions, which result in unique group outcomes. The first where one projects self perceptions to the group (e.g., of course this group will succeed/fail, I am in it). The second where one accounts for teammates in group judgments (e.g., of course this group will succeed/fail, look who else is in it). And the third where one accounts for everyone in the group (e.g., of course this group will succeed/fail, look at everyone in it).

Finally, transpersonal efficacy will allow investigation of the specific dynamics of efficacy perceptions that occur within groups, which cannot be captured with measures of self and collective efficacy. For example, consider Figure 2. Each of the triangles represents a three person group. Each number represents a member's collective efficacy belief, one being the lowest possible level of collective efficacy, five being the highest. So, Group A has one highly efficacious member, and two members who do not believe in the group's ability to accomplish its goals, while Group B has two members with fairly high collective efficacy beliefs, and one member who does not believe in the group at all. Currently, the collective efficacy of these groups would most likely be assessed by aggregating these collective efficacy beliefs into one combined score (Whiteoak, Chalip, & Hort, 2004). In this case, both groups would have a collective efficacy of three. However, it is easy to imagine the group with one highly efficacious member behaving much differently than the group with two members with high collective efficacy. Still, in addition to looking at the mean collective efficacy of group members, many researchers would argue that dispersion is important. In other words, the differentiation between group member beliefs is also predictive of group behavior (Katz, et al., 2005). Nevertheless, the collective efficacy perceptions of members of both of these groups have a variance of two. Consequently, a dispersion measure would likewise not aid in differentiating these two groups.

Only by utilizing transpersonal efficacy to investigate the pattern of interacting efficacy perceptions with both groups, can one make predictions as to how these groups will behave differently due to the specific pattern of their members' efficacy.

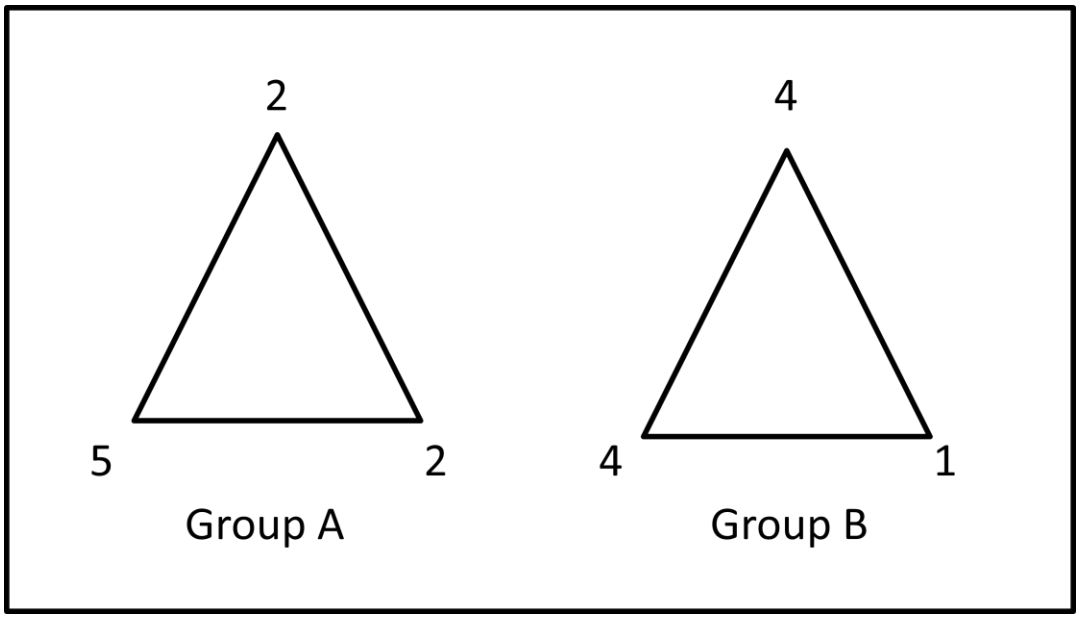


Figure 2. Two Three-Person Groups with Equal Means and Variances in Their Perceptions

In order to investigate the specific behaviors transpersonal efficacy influences three series of studies were conducted. The first set investigates transpersonal efficacy in dyadic competitive and cooperative situations in two studies. The first of these shows transpersonal efficacy can drive motivation, and that this effect is mediated by the role of the other in the task environment. The second then builds upon the first by investigating how self and transpersonal efficacy jointly influence task motivation in light of the role another takes in a task environment. The second set of studies draw on social cognitive theory to predict that the pattern of multiple interacting efficacy perceptions within a group environment regulates both the level and direction of within-group effort allocation. Further, I use expectancy theory to predict task interdependence as a moderator of whether these perceptions produce efficient effort allocations. Support for these

propositions is found in two field studies involving basketball and project teams. The hypotheses are supported, but only when group members cannot identically and simultaneously exert effort towards the group task, and therefore a distribution mechanism is needed. Then, a final study was conducted, involving intact teams solving a hidden profile task. This purpose of this study was to link the behavioral drivers found in expectancy theory, in Studies 3 and 4, to a novel outcome. Specifically, expectancy theory was used to link motivation to information exchange in groups. In sum, the five studies conducted show that transpersonal efficacy predicts individual behavior in groups above the ability of self and collective efficacy, and does so in situations where these two types of efficacy may not be applicable, such as competitive environments.

## How Perceptions of Single Others Influence Task Performance

Studying the effects of transpersonal efficacy on performance, as well as how self-efficacy and transpersonal efficacy jointly influence performance, is important because many organizational tasks involve multiple individuals, such as teammates working in pairs, negotiators competing against each other, and superiors and subordinates working towards common goals (Mast, Hall & Schmid, 2010; Moreland, 2010). Further, the increasingly complex problems faced by modern organizations are causing an increase in the number of task environments which involve others (Devine, et al., 1999; Gully, et al., 2002; Guzzo & Shea, 1992). Investigating transpersonal efficacy will address this growing concern by examining how these others influence people's individual performance in light of their own self-efficacy.

### Transpersonal Efficacy's Place in Social Cognitive Theory

Self-efficacy is the focal construct of social cognitive theory, which is based on the premise that people have the agency to direct their own effort, and will mobilize that effort by enacting behaviors that are controllable, and that produce desired effects (Bandura, 1997). Meta-

analyses of a multitude of studies have shown that self-efficacy influences performance in academic settings (Multon, Brown & Lent, 1991), health functioning (Holden, 1991), athletics (Moritz, Feltz, Fahrbach & Mack, 2000), and work organizations (Stajkovic & Luthans, 1998). However, social cognitive theory also recognizes that people do not act in isolation. In addition to self-efficacy, peoples' environments influence their performance expectations and thus the direction of their efforts (Bandura, 1997). For example, increasing Israeli government workers' efficacy in their computer systems by praising the systems' superior technology decreased the time it took those workers to file entitlement claims by 43.5% (Eden, et al., 2010).

In interpersonal settings, other individuals who influence a focal task are a crucial component of that task's environment. Therefore, in interpersonal scenarios, transpersonal efficacy should influence performance in conjunction with self-efficacy. However, while the effect of self-efficacy on performance should be positive regardless of others (Bandura & Locke, 2003), the relationship between transpersonal efficacy and performance should vary based on others' roles in the task environment. Specifically, because task environments influence performance by impacting the link people see between their own efforts and desired rewards (Bandura, 1997; Eden, 2001), transpersonal efficacy should be positively related to performance when one's own reward is positively and directly related to another person's ability. Conversely, transpersonal efficacy should be negatively related to performance when this relationship becomes reversed. Accordingly, the relationship between transpersonal efficacy and performance is investigated in a series of tasks where a single "focal other" acts as an opponent, an outcome interdependent partner, or an outcome non-interdependent partner.

**Transpersonal Efficacy in One on One Competition**

In competitions, opponents are viewed as obstacles to obtaining a desired outcome. As such, an opponent's skill level is perceived as a goal to be beaten (Locke, Latham & Erez, 1988). Because individuals will utilize their effort to the point of obtaining a desired result (Bandura, 1997), and more difficult goals require greater effort to achieve, difficult goals have repeatedly been shown to lead to increased performance (Locke, 2001). In competitive environments, the point of obtaining a desired reward occurs when an individual betters his or her opponent. Therefore, it is expected that people will perform better on a competitive task as transpersonal efficacy in their opponent increases. Further, the economics literature provides evidence that individuals adjust their performance in direct and positive relation to their opponents' perceived skill level in laboratory studies involving letter stuffing tasks (Falk & Ichino, 2006), and in field studies involving grocery baggers (Mas & Moretti, 2009) and fruit pickers (Bandiera, Barankay & Rasul, 2009). These findings corroborate those of goal setting theory and are important because they indicate that a capable employee's skill will be wasted if he or she is made to compete against someone perceived to be incompetent. Therefore, I hypothesize that:

H1: In a one-on-one competition, individuals with high transpersonal efficacy in their opponent will perform better than those with low transpersonal efficacy in their opponent.

**Transpersonal Efficacy and Outcome Interdependence in Dyadic Tasks**

The extensive literature reviewing the effects of working with others has discerned that cooperative others can both attenuate and exacerbate individual performance. Whether the former or the latter is more likely to occur depends on the importance of a focal individual to the dyadic outcome (Karau & Williams, 1993). In other words, there is considerable evidence for an argument that outcome interdependence moderates the relationship between working with a

teammate and the performance of a focal individual on a task. First, in outcome interdependent tasks, when successful performance depends on the contributions of both members of a dyad, (Wageman, 1995), the performance of each member is directly related to their perceptions of their partner's skill level (Kerr, et al., 2007). The earliest observation of this effect occurred when Köhler (1926, 1927) found that dyads performing weightlifting arm curls outperformed coactive individuals. In this task, performance was operationalized as the amount of time each member of a dyad could lift an 82 kilogram metal bar. The members of the dyad were jointly responsible for the performance because the team's final score was determined when either member dropped the bar, thus the task was outcome interdependent. According to social cognitive theory, this result occurs because individuals will not exert effort towards a task if that effort will not affect task performance (Bandura, 1997). When working on an outcome interdependent task with an unskilled partner one does not need to perform well since their partner will likely dictate the performance of the dyad. Conversely, since individuals do not want to negatively impact dyadic performance they will try to match a skilled partner's performance (Kerr, et al., 2007). The large number of studies supporting this finding (Hertel, Kerr & Messe, 2000; Kerr, et al., 2005; 2007) suggests that transpersonal efficacy will be positively related to performance in outcome interdependent tasks.

However, in outcome non-interdependent task environments, where others are not necessary to achieve performance, working on a task with another individual will reduce this belief that one's own contribution is essential for the successful completion of the task (a belief about the instrumentality of one' contribution, see Vroom, 1964). When working alone one is entirely responsible for any performance, but when working with another one means that one is forced to share credit. This shared instrumentality is manifested in reduced individual effort, and

thus performance (Karau & Williams, 1993). For example, it has been found that students collecting money for charity collect less money when they work with a greater number of teammates than they do when they work alone (Condie, Warner & Gillman, 1976), because every dollar someone else collects towards a pre-set group goal is one dollar other members do not have to collect. Additionally, this tendency has been observed through social loafing in a variety of tasks, such as rope pulling (Ingham, Levinger, Graves & Peckham, 1994), shouting (Latané, et al., 1979), brainstorming (Harkins & Jackson, 1985; Williams & Karau, 1991) and making quality ratings (Petty, Harkins & Williams, 1980; Weldon & Gargano, 1985). In each situation, having partners reduces the effort people exert towards a task by causing perceptions of shared instrumentality for the joint outcome. Therefore, contrary to the situation in outcome interdependent tasks, where others facilitate performance since they are necessary to perform, in outcome non-interdependent tasks others become impediments to one's own performance because they are not necessary to perform, but still decrease instrumentality. Further, in outcome non-interdependent tasks instrumentality is viewed as a zero sum game so that an increase in the perceived instrumentality of one partner is accompanied by a decrease in the perceived instrumentality of the other (Karau & Williams, 1993). Because more skilled individuals are likely to receive greater instrumentality attributions, focal individuals with skilled partners are left to experience decreased instrumentality, and to perform more poorly (Vroom, 1964). Thus, transpersonal efficacy should be negatively related to performance in outcome non-interdependent tasks. In summary, outcome interdependence will moderate the relationship between transpersonal efficacy and individual performance such that:

H2: An interaction exists such that, in dyadic outcome interdependent tasks, individuals who have high transpersonal efficacy in their teammate will perform better than those

who have low transpersonal efficacy in their teammate; while in dyadic, outcome non-interdependent tasks individuals who have low transpersonal efficacy in their teammate will perform worse than those who have high transpersonal efficacy in that teammate.

**Transpersonal Efficacy as a Distinct Perception**

I define and explore transpersonal efficacy in order to extend social cognitive theory by providing evidence for the hypothesis that efficacy perceptions of single others in a task environment influence performance. To accomplish this, transpersonal efficacy must be shown to be distinct from similar constructs outside the social cognitive paradigm, the most salient of which is trust. Rousseau et al. (1998) define trust as the intention to accept vulnerability based on positive expectations of the intentions of another. Based on this definition, the key difference between trust and transpersonal efficacy is that transpersonal efficacy is a belief in a person's capabilities to produce a given action and trust is a belief that that person will use his or her capabilities benevolently and to the advantage of the focal individual. For example, I may trust that John will do all he can to help me with my accounting report, but because I do not have high transpersonal efficacy in his accounting abilities I will not ask him for help. Conversely, I may have high transpersonal efficacy in his abilities, but not trust that he will help me since we are competing for the same promotion, thus yet again I will not ask him for help.

In addition, the three dimensions of trustworthiness, integrity, benevolence, and ability, may appear similar to transpersonal efficacy. Integrity refers to the extent to which an individual believes that another person abides by an acceptable set of principles, benevolence refers to the extent to which that individual is believed to want to do good (Mayer, Davis, & Schoorman, 1995). Both are distinct from transpersonal efficacy as they do not refer to perceptions of someone else's skill. Ability, however, is defined as the group of skills, competencies, and

characteristics that allow an individual to have influence in some domain (Mayer, Davis, & Schoorman, 1995). Ability is closer than integrity and benevolence to transpersonal efficacy because it contains a skill component, but it is broader and not inherently linked to a specific outcome as is the case with efficacy In addition, just because an individual has skills in a domain does not mean he or she will use them. Therefore, transpersonal efficacy is differentiated from the ability component of trustworthiness due to its specificity, outcome focus, and inclusion of specific behavioral criteria, and it is different from benevolence and integrity due to its focus on those behavioral criteria without implying a judgment about ethics or personal "goodness." In Study 1 I measured trust and the three dimensions of trustworthiness, to compare these with transpersonal efficacy in an effort to show that the latter is a unique construct.

## The Studies

Two experiments were conducted to test Hypotheses 1 and 2. In the first study transpersonal efficacy and the role of the other person in the task environment were manipulated to investigate the causal relationship between these two variables and task performance. In addition, Study 1 was designed to show that transpersonal efficacy differs from the similar constructs of trust and trustworthiness. The second study investigated how self-efficacy and transpersonal efficacy dually influence performance in the same dyadic and competitive situations.

As the studies are primary investigations of the relationships between self-efficacy, transpersonal efficacy, and performance, hypothetical dyads are used instead of actual interacting pairs to avoid potential confounding variables. Particularly, in interacting pairs, dyadic processes, such as coordination and communication, can affect motivation and performance variables through process loss and gains, and overshadow the effects of focal variables (Karau &

Williams, 1993). Therefore, creating hypothetical partners for focal individuals allowed performance outcomes to be more clearly attributed to individual level manipulated predictors (Karau & Williams, 1993). For example, when studying the effects of social loafing, Latané, Williams, and Harkins (1979) blindfolded individuals before telling them they either were, or were not, part of a team attempting to cheer as loudly as possible. Individuals were not actually placed with others, and as a result the motivational losses observed by those who believed themselves part of a team could be attributed to social loafing instead of to process loss. Therefore, in order to clearly state that the outcomes observed were due to changes in transpersonal efficacy, the role of the other person in the task environment, and performance, hypothetical dyads are used in Studies 1 and 2.

## Study 1

The first study investigated how transpersonal efficacy in opponents, outcome interdependent partners, and outcome non-interdependent partners is related to people's task performance. To do this, transpersonal efficacy was manipulated and performance outcomes were measured in a word find. In addition, Study 1 measured trust and the components of trustworthiness to identify transpersonal efficacy as a unique construct. Together, Study 1 places transpersonal efficacy within the social cognitive paradigm as a unique construct that influences task performance.

### Participants

120 Students from an introduction to organizational behavior class were recruited to participate in the study (57% male). Their mean age was 19.24 years (*SD* = 1.03 years).

### Procedure

Participants entered the laboratory and were randomly given a packet based on a 2 (transpersonal efficacy: high, low) x 3 (other person's role: opponent, outcome interdependent partner, outcome non-interdependent partner) between-subjects factorial design. All packets began with a preliminary word find containing 25 hidden words. Participants were given 10 minutes to complete this preliminary word find. Participants were then told they had been assigned a teammate/opponent with the following handwritten profile: Age: 19; Sex: male; Major: economics; Ethnicity: white; Hometown: Staten Island, NY. This profile was pretested to be that of a generic student taking introduction to organizational behavior at the participating university, and was used to keep the manipulation constant while not directly describing skill level. The different roles and abilities of the partner/opponent were then given. The characteristics of these roles are described below. Finally, transpersonal efficacy and trust measurements were collected, participants completed a second word find similarly formatted to the first, and then were debriefed.

Transpersonal efficacy was measured by asking participants to rate how confident they were that their partner/opponent could complete each of the 25 performance levels on a scale from 0% (not at all confident) – 100% (completely confident). This method is recommended by Bandura (1997) to measure efficacy because it captures information on both the level (how many words people believe they can find) and strength (how confident are they in these beliefs) of efficacy beliefs. After completing this measure, transpersonal efficacy level and strength were combined into a composite score by multiplying the amount of words participants believed they could find by the average likelihood of finding them. Trust was measured by reducing Mayer and Davis' (1999) scale to the dyadic level. This scale measures trust, as well as the ability, integrity,

and benevolence dimensions of trustworthiness. Each subscale is highly reliable (Cronbach's α = .82, .93, .95, .96, respectively).

## Manipulations

### Transpersonal Efficacy

Participants were given a partner or an opponent who performed in either the 25th (found 8 words) or 75th (found 14 words) percentile in the original find. Participants were only informed about their partner's previous performance level in terms of the number of words their partner found, they were not informed of their partner's percentile score. A pretest confirmed that these manipulations affected transpersonal efficacy in the desired directions. In addition, a manipulation check indicated that those yoked to someone who had performed in the $25^{th}$ percentile had lower transpersonal efficacy in that individual (M = 6.38, SD = 1.55) than those yoked to someone who had performed in the 75th percentile (M = 12.00, SD = 1.09), $t(118) = 14.02$, $p < .001$.

### Opponent

Those assigned an opponent were told they would be entering a word find competition against the individual described. Further, they were told that there was a $50 raffle open to all participants and if they beat their opponent, they would receive three entries into the raffle, as opposed to one if they lost.

### Outcome Interdependent Partner

Participants assigned an outcome interdependent partner were told their dyad would be entering a word find competition, and if they won each team member would receive $20. The differing incentives between the competitive and cooperative conditions were used because they pretested to be equally desirable, $t(44) = .31$, $p = ns$. In addition, participants were told that

dyadic performance would be measured by summing the total number of words found by each member. This scoring system created a scenario in which each team member was integral to performance, thus creating outcome interdependence (Wageman, 1995).

### Outcome Non-Interdependent Partner

Participants assigned an outcome non-interdependent partner were also told that their dyad would be entering a word find competition and, if they won, each team member would receive $20. However, they were informed that if both they and their teammate found the same word it would only count as one point towards their total score. This change to the scoring system created a scenario in which task outcome interdependence was lowered from that of the outcome interdependent task by the number of common words found, since the redundant words found would not affect team performance. In fact, if a subject believed a partner incapable of finding any unique words, the partner was not needed at all. In addition, if subjects believed that the partner could find all the words, the subjects themselves were not needed. Thus participants in this condition and their partners were relatively less outcome interdependent than those in the previous condition described. Moreover, participants were asked how dependent the outcome of their dyad was on their partner in both interdependence conditions, on a seven-point scale (*1 = not at all dependent to 7 = completely dependent*). The results confirmed that those in the outcome non-interdependent partner condition believed their dyad's performance was significantly less dependent on their partner ($M = 4.12$, $SD = 2.23$), than those in the outcome interdependent condition ($M = 5.46$, $SD = 1.79$), $t(78) = 2.96$, $p < .01$.

## Results

### Differentiating Transpersonal Efficacy from Trust and Trustworthiness

First, the relationships between transpersonal efficacy, trust, ability, benevolence, and integrity were investigated. To do this, a principal axis factoring with oblique rotation was conducted on the items in the trust scale and the transpersonal efficacy measure to determine what, if any, underlying structure existed within them. This analysis was used to provide a conservative test of the relationships between the focal variables. A method of exploratory factor analysis was chosen, as compared confirmatory analysis because I wanted to test the relationships between trust, trustworthiness, and transpersonal efficacy without imposing a preconceived structure on the outcome (Childs, 1990). Additionally, I implemented an oblique rotation to allow the factors to be correlated with each other.

The initial analysis retained four components explaining 76.57% of the variance in the items, see Table 1. The first component extracted accounted for 52.49% of the variance and contained all of the items comprising the ability and benevolence components of trust scale and two-thirds of the items comprising the integrity subscale. The second component extracted accounted for an additional 13.10% of the variance in the items. This component contained most of the items of the benevolence and integrity scales. The most important factor, as far as this paper is concerned, is the third component, which extracted 6.10% of the explained variance and contained only the transpersonal efficacy item. A fourth factor, accounting for 4.90% of the variance, contained items related to the benevolence and integrity dimensions of trustworthiness. The finding that the transpersonal efficacy item loaded separately from any component of trustworthiness supports the argument that transpersonal efficacy is a unique construct, different from trust and the three dimensions of trustworthiness.

Table 1

*Factor Analysis of Trustworthiness and Transpersonal Efficacy*

| | Factor | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| Ability 1 | 0.87 | | | |
| Ability 2 | 0.85 | | | |
| Ability 3 | 0.86 | | | |
| Ability 4 | 0.91 | | | |
| Ability 5 | 0.80 | | | |
| Ability 6 | 0.90 | | | |
| Benevolence 1 | 0.48 | | | 0.55 |
| Benevolence 2 | 0.33 | 0.39 | | 0.39 |
| Benevolence 3 | | 0.80 | | |
| Benevolence 4 | 0.38 | 0.43 | | |
| Benevolence 5 | 0.55 | 0.31 | | |
| Integrity 1 | | 0.67 | | |
| Integrity 2 | 0.60 | | | |
| Integrity 3 | | 0.79 | | |
| Integrity 4 | | | | 0.85 |
| Integrity 5 | 0.49 | 0.53 | | |
| Integrity 6 | 0.41 | 0.57 | | |
| Transpersonal Efficacy | | | 0.93 | |
| EigenValue | 11.02 | 2.75 | 1.28 | 1.03 |
| % Variance Explained | 53.49 | 13.10 | 6.10 | 4.90 |
| Total Variance Explained | 76.69 | % | | |

*Note:* Principal axis factoring was conducted with an oblique rotation. Factor loading below .30 were omitted from the table

**Transpersonal Efficacy and Performance**

In competitive task settings, the other person in the task environment (the opponent) determines the criterion for performance, in the sense that the better the opponent performs, the better a focal individual needs to perform to contribute to the performance outcome. Accordingly, it was expected that in competitive situations individuals would perform better when a skilled opponent was present in the task environment than when yoked to an unskilled

one. This was the case. As anticipated, those competing against an opponent in the 75th percentile performed better (M = 10.89, SD = 3.14) than those competing against an opponent in the 25th percentile (M = 9.01, SD = 2.73), $t(39) = 2.02$, $p < .05$, d = .64, supporting Hypothesis 1.

Further, in cooperative, dyadic tasks, I predicted that the role of participant's partners, as either outcome interdependent or outcome non-interdependent teammates, would interact with the participant's transpersonal efficacy in those partners to influence performance. To test this hypothesis, a 2 (outcome interdependence of partner) x 2 (transpersonal efficacy in partner: high or low) ANOVA was conducted. The results indicated that there was no main effect of either transpersonal efficacy or the outcome independence of participant's partners on performance, but there was a significant interaction between transpersonal efficacy and outcome independence, $F(3, 120) = 11.65$, $p < .01$, see Table 2.Thus, Hypothesis 2 was supported. Two follow-up *t*-tests were conducted to investigate where this interaction lay. As was the case in the in competitive condition, in outcome interdependent tasks, the partner in the task environment establishes the criterion for the participant's own performance, since an outcome interdependent dyad cannot perform well with one incompetent member. Therefore, I expected that those with high transpersonal efficacy in outcome interdependent partners would perform better than those with low transpersonal efficacy in those partners. This was the case, as those who worked interdependently with a skilled partner performed better (M = 12.33, SD = 4.57) than those who worked with an unskilled partner (M = 8.46, SD = 4.11), $t(38) = 2.82$, $p < .01$, d = .89. See Figure 3. In outcome non-interdependent tasks, on the other hand, a skilled or competent partner will not be seen as providing needed input to a team outcome, but instead as an impediment to expressing one's own instrumentality. Since instrumentality is seen as zero-sum in such

situations (Karau &Williams, 1993), participants were expected to perform better when paired with an unskilled as compared to a skilled partner. Again, this was the case. As predicted, in the outcome non-interdependent task environment, those paired with cooperative others performing in the 25th percentile performed better (M = 11.47, SD = 3.71) than those paired with cooperative others performing in the 75th percentile (M = 9.16, SD = 2.87), $t(39) = 2.20$, $p < .01$, d = .70. See Figure 3.

Table 2

*How Transpersonal Efficacy and Outcome Interdependence Influence Individual Performance in Dyads*

| *Source* | *df* | *Sum of Squares* | *Mean Square* | *F* | *p* |
|---|---|---|---|---|---|
| Corrected Model | 3 | 183.39 | 61.13 | 4.55 | 0.005 |
| Intercept | 1 | 10437.97 | 10437.97 | 776.23 | <0.001 |
| Transpersonal Efficacy (TE) | 1 | 4.47 | 4.47 | 0.33 | 0.566 |
| Outcome Interdependence (OI) | 1 | 0.54 | 0.54 | 0.04 | 0.842 |
| TE x OI | 1 | 156.71 | 156.71 | 11.65 | 0.001 |
| Error | 76 | 1411.93 | 13.45 | | |
| Total | 80 | 13919.00 | | | |
| Corrected Total | 79 | 1595.32 | | | |

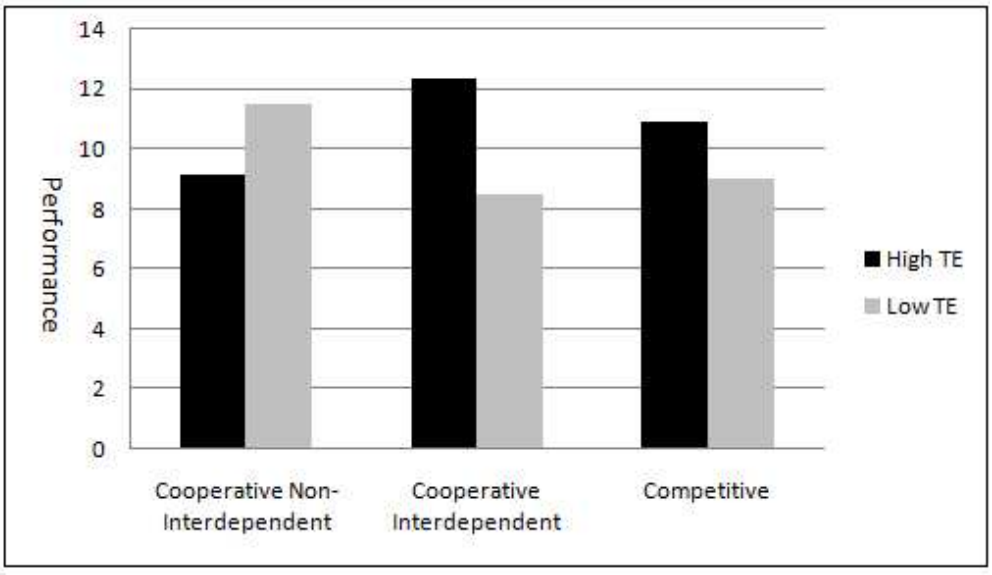


Figure 3. The effect of transpersonal efficacy on performance on a word find in Study 1.

## Discussion

As anticipated, when dyadic performance was directly dependent on another's performance, participants performed better when the other was skilled. In addition, when the partner's skill level was unnecessary for the dyad's performance, participants performed better when paired with someone who was unskilled. These results support Hypotheses 1 and 2. Taken together, the results confirm that when others, either partners or opponents, are necessary for reaching one's own performance goal, transpersonal efficacy is directly related to individual performance. However, when others impede on one's own sense of instrumentality, performance suffers (Vroom, 1964). In addition, Study 1 measured trust and the three dimensions of trustworthiness and provided support for the argument that transpersonal efficacy is distinct from these constructs.

# Study 2

Transpersonal efficacy will not act on performance in isolation. As any task which involves others will inherently involve the self, it will act in conjunction with self-efficacy to influence it. The second study builds upon the first by investigating how self-efficacy and transpersonal efficacy dually and naturally influence individual task performance.

## Participants

120 students from an introductory psychology class at a large northeastern university were recruited to participate in the study (51% male). Their mean age was 20.24 years (SD = 1.14 years).

## Procedure

The procedure mirrored that of Study 1, with the exception of the information provided regarding the focal other (the partner or opponent) and the measurement of self-efficacy. First, participants randomly received one of three packets based on the role of the focal other. As in the previous study, all packets began with a preliminary word find taking 10 minutes and containing 25 hidden words. Participants were then told that they had been assigned either a teammate or an opponent who had found 11 words (50th percentile = 11.26 words based on a pilot) in the preliminary word find they had just completed. Next, descriptions of the participant's teammate or opponent were given in the same manner as Study 1. Again, those in the outcome non-interdependent condition believed that their dyad's performance was significantly less dependent on their partner (M = 3.89, SD = 2.41), than those in the outcome interdependent condition (M = 5.23, SD = 1.86), $t(78)$=2.78, $p < .01$. Then transpersonal efficacy measurements were taken in the same manner as Study 1, and self-efficacy measurements were taken. Self-efficacy was measured by asking participants to rate how confident they were that they could complete each of the 25 performance levels on a scale from 0% (not at all confident) to 100% (completely confident). Like transpersonal efficacy, this measure was used because it is recommended by Bandura (1997) since it captures both the level and strength of efficacy beliefs. Finally, participants completed the second word find, and were debriefed.

## Results

### Performance Based on Perceptions of Transpersonal Efficacy

In order to test Hypotheses 1 and 2, a series of regressions were conducted. First, in the competitive condition, final performance was regressed on transpersonal efficacy. Providing further support for Hypothesis 1 transpersonal efficacy in one's opponent positively predicted performance, $\beta = .246$, $t = 2.08$, $p < .05$, see Table 3.

Table 3
The Relationship Between Transpersonal Efficacy, Outcome Interdependence, and Performance

| Study 2 | Cooperative | | | Competitive | | |
|---|---|---|---|---|---|---|
| | B | SE | β | B | SE | β |
| Intercept | 7.370 | 1.055 | | 7.784 | 1.170 | |
| Transpersonal Efficacy (TE) | 0.297 | 0.108 | 0.246** | 0.206 | 0.099 | 0.246* |
| Outcome Interdependence (OI) | 6.472 | 0.880 | 1.660** | | | |
| TE x OI | 0.694 | 0.087 | 1.760** | | | |
| $R^2$ | 0.382 | | | 0.061 | | |

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

To test Hypothesis 2, a hierarchical regression was conducted to investigate whether outcome interdependence moderated the relationship between transpersonal efficacy is one's partner and task performance. The second and final step of the regression showed that the interaction between transpersonal efficacy and outcome interdependence explained significantly more variance in task performance than their main effects alone, $\Delta R2 = .372$, $F(3, 77) = 21.61$, $p < .001$. In the initial step neither transpersonal efficacy ($\beta = -.100$, $t = -1.01$, $p = .31$) nor outcome interdependence ($\beta = .024$, $t = .24$, $p = .81$) predicted task performance, however, as can be seen in Table 3, once the interaction between transpersonal efficacy and outcome interdependence was added to the model both main effects (transpersonal efficacy: $\beta = .246$, $t = 2.75$, $p < .01$, outcome interdependence: $\beta = -1.661$, $t = 7.36$, $p < .001$) and the interaction became significant, $\beta = 1.764$, $t = 7.95$, $p < .001$. The great increase in the predictive ability of the second step over the first supports Hypothesis 2, but it also points to the fact that this may not be the whole story since both main effects also predicted performance. Still, these results are not entirely unexpected as they are in line with research on the Köhler effect and expectancy theory.

As previously stated, research on the Köhler effect has consistently shown that individuals put more effort towards a task when paired with a more highly skilled partner since

they do not want to be responsible if the dyad fails (Hertel, Kerr & Messe, 2000). Finding a main effect of transpersonal efficacy on performance is in line with this finding. Secondly, and again as previously discussed, working in groups low in outcome interdependence decreases individual instrumentality, reducing performance (Karau & Williams, 2001). The negative main effect of outcome interdependence on performance, indicating lower individual performance under low outcome interdependence, provides additional support for this theory. Still, of most importance to the current argument, the interaction between these variables was significant in the hypothesized direction, as can be seen in Figure 4. This finding supports Hypothesis 2 and indicates that the role of one's partner in a task environment interacts with one's perceptions of that partner to influence task performance, an important finding with regard to dyadic task design, more so when the numerous dyadic tasks in organizations are considered (Devine, et al., 1999; Gully, et al., 2002; Guzzo & Shea, 1992)

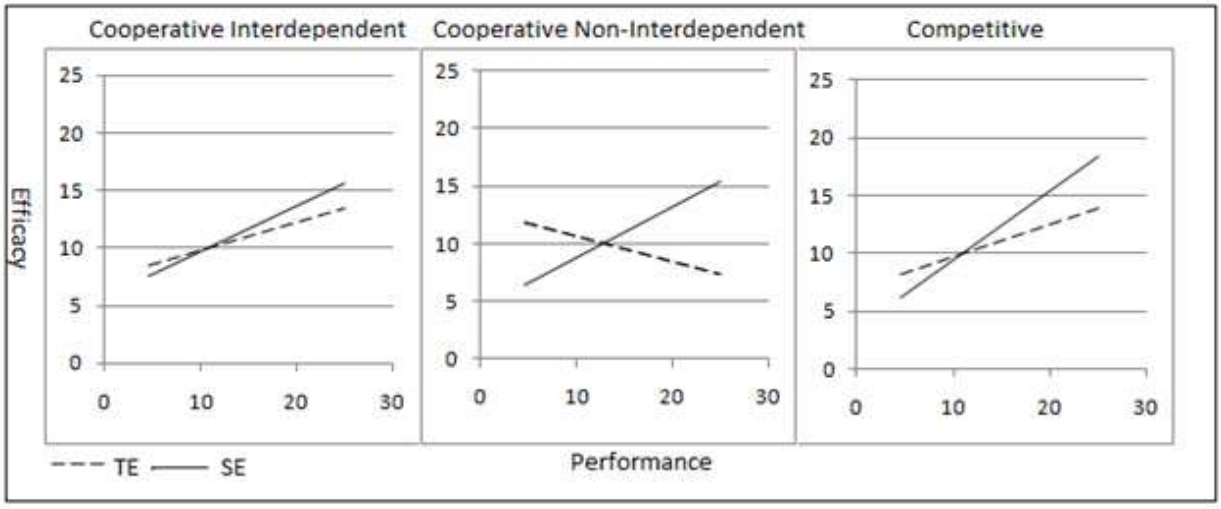


Figure 4. The effects of self-efficacy and transpersonal efficacy on performance on word find in Study 2.

**Performance Based on Perceptions of the Self and Others**

Although not specifically hypothesized, a natural question that arises concerning transpersonal efficacy is how it influences performance in conjunction with self-efficacy since all task environments including transpersonal efficacy will inherently involve both the self and at least one other. This was tested by a series of regressions. First, as in Study 1, when the effect of transpersonal efficacy on performance was assessed holding self-efficacy constant, transpersonal efficacy predicted performance on the final task in all three conditions. In the cooperative, non-interdependent condition high transpersonal efficacy had a negative effect on performance ($\beta$ = -.305, $t$ = -2.62, $p < .05$), whereas in the competitive ($\beta$ = .246, $t$ = 2.08, $p < .05$) and in the cooperative, interdependent conditions ($\beta$ = .350, $t$ = 2.30, $p < .05$), high transpersonal efficacy had a positive effect on performance, providing further support for Hypotheses 1 and 2.

However, when transpersonal efficacy and self-efficacy were simultaneously investigated as drivers of performance, mixed results were found. In the dependent conditions, where the effects of both types of efficacy on performance had similar valence, self-efficacy masked the contributions of transpersonal efficacy (cooperative, outcome interdependent, SE: $\beta$ = .761, $t$ = 5.33, $p < .01$, TE: $\beta$ = .117, $t$ = .90, $p > .05$; competitive, SE: $\beta$ = .307, $t$ = 2.47, $p < .05$, TE: $\beta$ = .072, $t$ = .66, $p > .05$). However, in the cooperative, outcome non-interdependent task, where self-efficacy and transpersonal efficacy had opposite effects on performance, both remained significant contributors to it, SE: $\beta$ = .358, $t$ = 3.70, $p < .01$, TE: $\beta$ = -.211, $t$ = 2.13, $p$ <.05, see Table 4 and Figure 4.

Table 4

*The Relationship Between Self-Efficacy, Transpersonal Efficacy, and Performance*

| Study 2 | Competitive | | | Cooperative (Outcome Non-Interdependent) | | | Cooperative (Outcome Interdependent) | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | SE | β | B | SE | β | B | SE | β |
| Intercept | 6.150** | 1.307 | | 9.135** | 1.567 | | 4.153 | 2.755 | |
| Transpersonal Efficacy | 0.072 | 0.110 | 0.087 | -0.211* | 0.099 | -0.234 | 0.238 | 0.266 | 0.117 |
| Self-Efficacy | 0.307* | 0.124 | 0.324 | 0.358** | 0.097 | 0.407 | 0.761 | 0.142 | 0.681** |
| $R^2$ | 0.140 | | | 0.253 | | | 0.455 | | |

*p<.05

**p<.01

*Note.* DV = Performance

**Discussion**

Study 2 was conducted to extend the nomological network of transpersonal efficacy and further embed it in the social cognitive literature by investigating how it affects performance in conjunction with self-efficacy. Mixed results were found. The relationship between self-efficacy and task performance is well established (Bandura & Locke, 2003; Stajkovic & Luthans, 1998). This relationship was found to hide the effects of transpersonal efficacy on performance in competitive tasks, and cooperative outcome interdependent tasks, since adding self-efficacy to the model involving transpersonal efficacy and performance made the positive relationship between transpersonal efficacy and performance insignificant. However, transpersonal efficacy predicted performance in isolation in all three task environments, as well as in conjunction with self-efficacy in the cooperative outcome non-interdependent task, providing further evidence in support of Hypotheses 1 and 2. Additionally, I found that outcome interdependence does not entirely moderate the relationship between transpersonal efficacy and performance in dyadic tasks, as both outcome interdependence and transpersonal efficacy had significant main effects on performance in cooperative environments, in light of their interaction. Still, this finding was

in line with previous research on the Köhler effect and expectancy theory and does not overshadow the importance of the interaction between outcome interdependence and transpersonal efficacy influencing performance in the predicted direction, supporting Hypothesis 2. Overall, Study 2 provides evidence that transpersonal efficacy influences task performance, and does so in conjunction with self-efficacy in outcome non-interdependent environments.

## General Discussion

I postulate, and describe two studies that provide evidence for the argument that in addition to self-efficacy, efficacy perceptions of single other individuals in a task environment can influence individual task performance. In addition, the role of the other in the task environment, specifically how he or she relates to perceptions of instrumentality by influencing performance outcomes, is shown to moderate this relationship. Further, transpersonal efficacy is both theoretically and empirically differentiated from trust and trustworthiness.

Studies 1 and 2 provide convergent causal evidence that transpersonal efficacy drives performance based on the role of the focal other in the task environment. Specifically, I found that high transpersonal efficacy in a focal other leads to decreased performance in an outcome non-interdependent cooperative situation and increased performance in both outcome interdependent cooperative and competitive conditions. Taking both studies into consideration, it appears that when others in the environment directly influence one's task outcome, transpersonal efficacy has a direct effect on performance. In competitive tasks, others act as goals to be beaten since people will lose competitions if they do not outperform their counterparts (Locke, Latham & Erez, 1988). Likewise, in outcome interdependent tasks, more competent partners engender more competent responses in order to increase dyadic performance without hampering the performance of one's own team (Hertel, Kerr & Messe, 2000). However, when others in the

environment restrict people's instrumentality, as is the case in outcome non-interdependent dyads (Karau & William, 1993), transpersonal efficacy and performance have a negative relationship. Based on these findings, transpersonal efficacy can be viewed as a significant vehicle individuals use to guide their task performance.

Further, these findings clearly address dyadic issues in organizations. Many organizational tasks involve dyads, such as teammates working in pairs, negotiators competing against each other, and bosses and subordinates working towards common goals (Mast, Hall & Schmid, 2010; Moreland, 2010). Taken in conjunction, the results of Studies 1 and 2 have significant practical implications for such situations. First, they indicate that if a pair is simply formed, as it often the case, and given a collective goal to accomplish without taking individual instrumentality into account, pairing two skilled team members together may squander the skills of each, as they will both likely view the other as impeding their own instrumentality. However, if members are made aware that both are necessary for performance, the positive views they hold of one another will increase their individual efforts, leading to increased dyadic performance. These findings may be especially relevant when power differences exist in dyads, such as when a manager is working with an employee to complete a task (Mast, Hall & Schmid, 2010), since in these situations one party is likely to be inherently viewed as more instrumental to the dyadic outcome.

Second, the studies indicate that in competitive scenarios, such as negotiations, capable opponents are not necessarily to be feared, as their perceived competence can engender higher performance in their counterpart. Furthermore, in these situations, skilled individuals may be ill used competing against novices as they are likely to not perform up to their capabilities. Again,

these results should not be taken lightly as dyads are omnipresent in various forms throughout organizations.

**Limitations and Directions for Future Research**

The studies described here are an initial step in investigating what factors influence transpersonal efficacy and how transpersonal efficacy affects individual performance in interpersonal environments. As an initial step, and as recommended when first investigating the question of whether one construct can influence another (Ilgen, 1986), they provide stringently controlled tests of how transpersonal efficacy is affected by and affects focal variables. However, as is this case with any study, certain design characteristics were limited in favor of others which aligned with the goals of the study. The two most salient design features which limited the applicability of the current study were the time period individuals encountered others and the artificiality of the others themselves.

First, the experiments described took place over a half an hour time period in the lab, and involved a relatively simple task. Second, participants did not actually interact with their partners or opponents. This was done to reduce the learning curve of participants in order to study interactions among individuals in a controlled environment. Specifically, hypothetical dyads were used to causally relate the results found to manipulated variables instead of to process loss (Karau & Williams, 1993; Latané, Williams & Harkins, 1979). Still, this format did not allow an examination of the development of dyads or the study of dyadic processes, two phenomena present in dyads within organizations (Ilgen, et al., 2005).

The time limitations of the lab precluded the current study from incorporating team development. Yet many processes which occur both at the beginning and end of team interactions are important to their performance. Development processes such as communication

during the planning of group behavior (Barry & Stewart, 1997), finding an initial group voice (Erez, et al., 2002), and creating shared mental models (Marks, et al., 2002) have been linked to team performance and effectiveness. Further, group processes such as bonding (Bishop & Scott, 2000), conflict (Jehn, 1994), and helping (Podsakoff, Ahearne & MacKenzie, 1997) have been linked to similar positive outcomes, yet, these were not examined in the current study due to the use of hypothetical teammates and opponents.

While these elements of interaction were not explored in the current study, they all provide opportunities for future research. For example, regarding the influence of transpersonal efficacy on interpersonal processes, it has been found that knowledge perceptions can affect dyadic information exchange such that people are more likely to seek from and provide information to those they view as more expert (van der Vegt, Bunderson & Oosterhaf, 2006). Therefore it seems plausible that transpersonal efficacy would likewise have a positive relationship with information exchange. In order to answer such questions field studies should be conducted to investigate how transpersonal efficacy effects effort in more varied environments and to investigate the predictive validity of transpersonal efficacy in such scenarios and the external validity of the current findings. Finally, studies involving interacting dyads may provide further support for transpersonal efficacy and self-efficacy concurrently affecting performance, and to lend insight into dyadic processes. One reason for the mixed results found in Study 2 may have been that participants did not actually interact with others, causing transpersonal efficacy perceptions to be more abstract than if interaction had occurred, and resulting in self-efficacy drowning out transpersonal efficacy when predicting performance outcomes.

Still, despite these limitations, situations exist where people who have little previous experience working together are brought together to work for short periods of time. Such

situations resemble the environment in the current study and therefore provide applications for its findings. The most salient example of these situations exists in action teams, or teams which come together for a short time to complete a specific goal (Sundstrom, et al., 2000). In these teams, which include military combat crews, flight crews, surgery teams, and other highly specialized performance groups, task interdependence is high despite their short lifecycles (Sundstrom, et al., 2000). The results of the current studies indicate that in such groups fostering high transpersonal efficacy in one's teammates may be vital for members to put maximum effort towards performance and therefore complete their tasks. This is important due to the prevalence of such groups and the specialized and varied tasks they perform (Sundstrum, De Meuse & Futrell, 1990).

**Further Direction for Future Research: Transpersonal Efficacy in Groups**

In addition, future studies should explore the effects of transpersonal efficacy in larger groups to investigate the effects of multiple transpersonal efficacy perceptions interacting in a single environment. Currently, efficacy constructs are defined on two levels, the individual level and the group or collective level (Bandura, 1997). Collective efficacy is defined as a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given outcomes (Bandura, 1997). However, both of these constructs contain elements of the self, and thus in an interpersonal scenario both fail to clearly capture perceptions of specific others in a task environment because when the self is included in a collective judgment it may overshadow perceived other perceptions (Baker, 2001; Gibson & Earley, 2007). It is clear that self-efficacy focuses on the self (Bandura, 1997; Eden, 2001). However the self is also included in collective efficacy judgments since the self is part of any collective being judged. This is

important because individuals who exist outside of self-perceptions can still have significant effects on task performance (e.g. Festinger, 1954).

In an ideal situation each group member will perceive all other members' abilities accurately and create group perceptions by equally weighting those abilities, including those of the self. In such scenarios, where collective efficacy is an emergent process built over time through group interaction, groups will persevere longer in the face of adversity (Bandura, 1997; Gully, et al., 2002), set higher goals (Prussia & Kinicki, 1996), and be more effective (Gibson, 1999; Gibson, Randel & Earley, 2000). However, due to the aforementioned tendency to project self- perceptions on group characteristics (Baker, 2001; Gibson & Earley, 2007), this is not always the case. This tendency is evidenced in the significant positive relationship between self-efficacy and collective efficacy found in most studies which measure both variables (see Feltz & Lirgg, 1998; Lent, Schmidt & Schmidt, 2006; Magyar, Feltz & Simpson, 2004; Seijts, Latham & Whyte, 2000; Wang & Lin, 2008; Watson, Chemers & Presier, 2001). In such situations, where self and collective efficacy have similar valence, transpersonal efficacy should allow for distinctions to be made between ideal effective groups and groups made up of individuals with high self and collective efficacy, but low transpersonal efficacy. In other words, transpersonal efficacy should allow researchers to distinguish between people who form group perceptions based on all group members and those whose collective perceptions are clearly derived from their own high self-efficacy (Littlepage & Mueller, 1997). While these latter collections of self-proclaimed superstars may engender high individual performance, such collectives also decrease resource exchange between members (Larson, et al., 1998), which over time, may lead to feelings of isolation. These feelings may ultimately result in decreased collective efficacy and some group members excluding themselves from group judgments (Albanese & Van Fleet, 1985;

Kerr & Bruun, 1983). Therefore, transpersonal efficacy will help to differentiate between three explanations of congruent self and collective efficacy perceptions that will result in unique group outcomes. The first is the situation where one projects self perceptions to the group (e.g., of course this group will succeed/fail, I am in it). The second is where one accounts for teammates in group judgments (e.g., of course this group will succeed/fail, look who else is in it). The third is where one accounts for everyone in the group (e.g., of course this group will succeed/fail, look at everyone in it). Distinguishing between these accounts and their outcomes provides a useful and important line for future research on transpersonal efficacy, which will be discussed in the following two series of studies.

Organizations are continually restructuring to create task environments that involve others (Devine, et al., 1999; Gully, et al., 2002; Guzzo & Shea, 1992). Therefore, understanding how perceptions of focal others affect individual performance is a necessary step for organizational scientists. The current study focuses specifically on efficacy and provides the groundwork for enhancing social cognitive theory by allowing it to focus on specific other individuals. Further, the research provides evidence that these focal others are an important part of task environments as the studies demonstrate that transpersonal efficacy drives individual task performance and is a distinct construct which provides various avenues for future investigation due to the ever-increasing presence of task environments involving multiple individuals in organizations.

## A Social Cognitive Investigation of Group Inefficiency

Groups are necessary in modern organizations to pool diverse resources (Schneider & Northcraft, 1999) in the hope of solving problems above the ability of a single person (Ilgen, et al., 2005). In addition, the increasingly complex problems modern organizations face

necessitates the expanded use of groups (Devine, et al., 1999; Gully, et al., 2002; Guzzo & Shea, 1992). However, whether groups are achieving performance deserving of their integral status to organizations is a question still under debate (Allen & Hecht, 2004; Locke, et al., 2001). Studies of group behavior have discerned reliable and specific instances of groups not living up to the collective capabilities of their members. The brainstorming literature shows that aggregate individuals outperform groups in both the number and quality of ideas generated (Barki & Pinsonneault, 2001; Diehl & Stroebe, 1987, 1991; Paulus, et al., 1993). Learning research provides evidence that groups recall less information than aggregate individuals (Basden, Basden, Bryner, & Thomas, 1997; Weldon & Bellinger, 1997; Weldon, Blair, & Huebsch, 2000). And judgment and decision making researchers find that taking the decision of the single best decision maker within a group consistently produces a better result than taking that of the group after integrated discussion (Yetton & Bottger, 1982).

When completing a group task, each group member must decide how much of their own effort to allocate to that task, and in what manner. However, the findings cited above compose evidence of reliable problems groups incur when making these effort allocation decisions. The fact that aggregate individuals consistently outperform groups in brainstorming and memory tasks points to deficiencies in the amount of effort each individual member allocates towards group endeavors, as these types of inefficiencies have consistently been linked to free riding (Harkins & Petty, 1982; Kerr & Bruun, 1983; Williams, et al., 1981). Additionally, findings that groups often make inferior decisions to experts, despite having more aggregate information, point to issues with the direction of effort allocation, in the form of knowledge seeking and exchange, in group environments (e.g. Stasser & Titus, 1985). In the current paper, I utilize

expectancy and social cognitive theory in an attempt to explain these group member effort allocation deficiencies and to propose a mechanism to attenuate them.

According to expectancy and social cognitive theories, when individuals enter a context where there are multiple avenues to expend their effort to achieve goals, they decide how to allocate that effort based on the expectancy that they can enact behaviors which are instrumental to a desired outcome (Bandura, 1997; Vroom, 1964). Further, since individuals have limited cognitive and behavioral resources (Simon, 1997), they do this in a manner which maximizes the total amount of desired rewards obtained (Bandura, 1997; Vancouver, 2005). I argue that this theoretical framework can likewise be applied to the collectives of individuals who comprise groups, such that each group member's expectancies of themselves and each other group member interact to dictate the level and direction of individual within-group effort allocations. Additionally, I propose that task interdependence acts as a moderator of whether these perceptions, and thus effort allocations, are efficient. To accomplish this, the current paper focuses on efficacy, a situational and specific perception of confidence in a person or people's abilities (Pintrich and Schunk, 1996). Specifically, the interacting network of self-efficacy, one's confidence in one's his or her abilities to produce a given attainment (Bandura, 1997), and transpersonal efficacy, one's confidence in a specific other's ability to produce a given outcome (Emich, in press), that exists within a group is investigated as a distribution mechanism for the amount of effort each group member allocates towards a group task, the manner in which they allocate that effort, and whether these allocations are efficient.

**Transpersonal Efficacy in Groups**

When entering a task environment, one creates instrumentality and performance expectations based on the stimuli within that environment, and then allocates effort appropriately

(Eden, 2001). While in an individual task the link between one's own effort and an associated reward is quite clear, in group tasks their relationship becomes blurred due to other group members requiring varying amounts of credit for performance (Karau & Williams, 1993). Therefore, in group settings, one's own instrumentality can depend greatly on one's expectancies of fellow group members (Karau & Williams, 2001). And because of this, one should take transpersonal efficacy into consideration when allocating effort in a group.

In the next section I will argue that the multiple transpersonal efficacy perceptions that exist in teams should act to dictate the amount of effort each individual puts towards a group task and delegates to assisting each other group member. In this way, when the totality of group member transpersonal efficacy is considered, those who stimulate higher transpersonal efficacy in themselves will have a greater affect on group performance than those who are perceived to be less efficacious. Nevertheless, transpersonal efficacy does not address whether the pattern of effort allocation it creates is accurate, and therefore efficient. In other words, it is possible that group members engender high transpersonal efficacy due to factors other than their skills, and thus unjustly exert effort towards the task and receive group member assistance, resulting in poor group performance. In order to discuss the efficiency of effort allocation in teams, self-efficacy and task interdependence must be considered in conjunction with transpersonal efficacy, which will be done in the successive section.

**Transpersonal Efficacy and Individual Effort Allocation Level and Direction in Groups**

Past research on motivation in the presence of others has shown that perceptions of team members' abilities can regulate individual effort allocation in interpersonal contexts such that individuals adjust the amount of effort they allocate to a joint endeavor inversely to perceptions of their teammates' abilities (Karau & Williams, 2001). As expectancy theory states, individuals

will exert effort towards a task when they feel that effort will influence task performance (Vroom, 1964). However, in a group environment, factors other than one's personal effort play a large role in determining performance, the most prominent of which are the other group members (Karau & Williams, 1993). Because each other person working towards the group outcome requires some credit for performance, the more people one works with the less instrumental he will feel towards the group outcome. Copious evidence of this exists in research on social loafing, indicative of such instrumentality losses due to the presence of others (Karau & Williams, 2001). Social loafing has been observed in tasks from tug of war (Ingham, Levinger, Graves & Peckham, 1974) to shouting (Latané, Williams & Harkins, 1979), to brainstorming (Harkins & Jackson, 1985; Williams & Karau, 1991), to making quality ratings (Petty, Harkins & Williams, 1980; Weldon & Gargano, 1988). Additionally, when people are paired with skilled individuals they will perceive the need to put forth less effort towards a group outcome than if paired with less skilled team members since more talented teammates are perceived as more instrumental to group performance (Karau & Williams, 1993). Therefore, it can be expected that

> H1: The aggregate level of a focal individual's transpersonal efficacy in his or her teammates is negatively related to his or her individual effort allocation level in a group task.

In addition, as groups interact they develop and strengthen shared beliefs (Kozlowski & Klein, 2000), including efficacy perceptions (Katz-Navon & Erez, 2005). Therefore, people working together should share a sense of the skill level of each member of a group. These perceptions should then influence instrumentality perceptions, and in turn effort allocation, such that individuals feel more instrumental to a group outcome when others have higher transpersonal efficacy in them. Data corroborating this statement exist in studies examining the

Pygmalion and Gollum effects (e.g. Davidson & Eden, 2000; Eden, 1990; Eden & Ravid, 1982; Eden & Shani, 1982). These studies provide evidence that high expectations of oneself by others engender increased effort, and low expectations of oneself lead to decreased effort. For example, evidence exists that if a manager has higher expectations for an employee, that employee is more likely to put effort towards his job and perform well (Eden, 1990). Therefore, in groups which interact over time,

H2: The aggregate level of other group members' transpersonal efficacy in a focal individual is positively related to that individual's effort allocation level in a group task.

In addition to influencing individual effort allocation level towards a group task, transpersonal efficacy should dictate individual effort allocation direction. In group tasks, individuals can choose to put their effort towards assisting teammates in the form of helping behavior. Helping is defined as any action by which individuals positively affect their teammates performance (e.g. Flynn, 2006), for example, by exchanging important information with them, or by physically completing a task with them. When people engage a task they attempt to use their effort to gain the highest reward possible (Bandura, 1997). Moreover, individuals will allocate effort in places where they perceive the greatest link between those resources and a desired reward (Vroom, 1964). In a group setting this means that individuals should allocate effort to helping others in whom they have the highest transpersonal efficacy, since they believe them to be the most capable of having the greatest positive influence on the group outcome. In other words, transpersonal efficacy can be expected to govern within-group helping behavior such that

H3: Individuals will exert more effort helping those in whom they have high transpersonal efficacy than to those in whom they have low transpersonal efficacy.

**The Importance of Self-Efficacy and Task Interdependence**

Although Hypotheses 1-3 address how the pattern of transpersonal efficacy that exists within a group should influence member effort allocation, it does not address whether these allocations are efficient. For example, a group member could engender high transpersonal efficacy due to factors independent of their actual skill level, such as because one has high status. To address the efficiency of these allocations, self efficacy and task interdependence are needed. As stated, groups in organizations are usually employed when task complexity increases to a point where a single individual can no longer complete the task (Ilgen, et al., 2005). For this reason, group tasks usually involve multiple subtasks which must be combined to form a single whole (Gully, et al., 2002). Self-efficacy has consistently been shown to lead people to choose to exert effort in domains that they perceive themselves to be highly skilled in (Bandura, 1997). Due to the link between self-efficacy and domain choice (Bandura, 1997; Vancouver, 2005; Vancouver, More & Yoder, 2008) individuals complete tasks in high self-efficacy domains at a higher level than in low self-efficacy domains (Bandura, 1997; Vancouver, 2005; Vancouver, More & Yoder, 2008). So, allowing individuals to follow their natural tendencies and exert effort in domains in which they have high self-efficacy should allow for more efficient group effort allocation, since individuals performing in high self-efficacy domains will better utilize their efforts.

Therefore, because transpersonal efficacy should dictate who group members help and which members exert effort, and self-efficacy should dictate whether exerting effort or receiving help leads to increased group performance, group members will efficiently allocate effort when their transpersonal efficacy in their teammates is aligned with those other group members' own self-efficacy. In other words, groups should function more efficiently when group members perceive each other's strengths as they actually exist, and these strengths should lie in high self-

efficacy domains (Bandura, 1997; Vancouver, 2005; Vancouver, More & Yoder, 2008). However, as can be seen in the various examples of group deficiencies previously discussed (e.g. Stasser & Titus, 1985), this optimization rarely occurs. Further, due to the frequency of group effort allocation errors, the question of what scenarios create more efficient distributions of group member effort is quite important.

I propose that task interdependence can provide one such answer by acting as a moderator of the relationship between a person's own self-efficacy and other's transpersonal in that person. Group tasks can be more or less task interdependent based on how necessary each member is perceived to be to the achievement of the group outcome (Wagemen, 1995). When all group members believe each member is necessary for group performance, information and resource sharing within the group increases because it is necessary that every member is linked to the group task. It is this increase in information and resource sharing that should allow accurate efficacy information to be exchanged between group members, thus allowing self and transpersonal efficacy to align and result in effort being allocated more optimally.

A base premise of social cognitive theory is that individuals desire to allocate effort to high self-efficacy domains (Bandura, 1997). However, as previously stated, this becomes difficult to do in group tasks since other individuals besides the self are often instrumental to performance (Karau & Williams, 1993; 2001). This shared instrumentality is exacerbated in task interdependent tasks since when each team member is responsible for performing a vital team function having one incompetent member renders one's own effort towards the team outcome moot. Therefore, in task interdependent scenarios having accurate transpersonal efficacy is a paramount concern. It has been found that members of highly task interdependent groups seek help more often (Cleavenger, Gardener & Mhatre, 2007), and are more likely to exchange task

relevant information regarding elements related to efficacy perceptions (Katz-Navon & Erez, 2005). In addition, the increased information exchange in task interdependent groups has been found to aid in the development of accurate within-group expertise perceptions (Zhang, Hempel, Han & Tjovold, 2007), which, similar to transpersonal efficacy, involve specific assessments of specific group members. Therefore, when task interdependence is high, the importance of each member to each other member's instrumentality elicits sharing behavior, increasing the similarity of group member beliefs. This process should allow self and transpersonal efficacy to align.

However, when group members perceive that one, or a few, of their team mates can be entirely responsible for team performance, as is the case in task non-interdependent teams, there is little need for members to share information about their skill sets since others are not necessary for one's own performance (Stajkovic, Lee & Nyberg, 2009). When this occurs, individuals are likely to develop their own knowledge structure concerning efficacy without taking others into consideration (Wagemen, 1995). Further, in task non-interdependent tasks, other members can actually act as impediments to one's own instrumentality to the group outcome (Karau & Williams, 1993). In other words, in task non-interdependent groups a small set of behaviors constitute a group performance, and since these behaviors can be done by any group member, if one person completes a behavior another does not need to. Therefore, members are actually competing for instrumentality towards the group outcome (Karau & Williams, 1993; 2001). In these situations it is not necessary to fully explore others' competencies and it is not desirable to use one's own effort to help others. Examples of this are found in the same studies previously cited, as they found that group members in less task interdependent tasks are less likely to seek help from each other (Cleavenger, Gardener & Mhatre, 2007), and are less likely to exchange task relevant information, specifically regarding elements related to efficacy perceptions (Katz-

Navon & Erez, 2005). Due to this lack of information sharing, self-efficacy and transpersonal efficacy should be unrelated in task non-interdependent tasks, resulting in inefficient within-group effort allocation. Therefore, an interaction between self-efficacy and outcome interdependence should exist such that:

> H4: As a group's task interdependence increases, the relationship between each member's self- efficacy, and the aggregate of the others members' transpersonal efficacy in them, will become increasingly positive.

## Studies

As a preliminary investigation of the hypotheses, Study 3 required a task context that contained the focal variables, and allowed them to interact without the interference of a large number of extraneous confounds. Sports provide such a context to study organizational phenomena because sports environments are more strictly controlled than businesses, while maintaining interactions among focal variables (Slack & Parent, 2006). Study 3 focused on three member recreational basketball teams, as this context provided many advantages to answer the questions posed. First, basketball is a game in which team members must interact to achieve performance. This allowed self, transpersonal, and collective efficacy the opportunity to affect focal outcomes. It also allowed for the existence of group level perceptions such as task interdependence. Second, basketball involves both individual and sharing behaviors, such as shooting and passing. These characteristics allowed investigation of both the level and direction of within-group effort allocation, permitting tests of Hypotheses 1-3. Third, basketball teams can vary in their perceptions of task interdependence as teams can have specific roles for their players, or play a pick-up style without well-defined roles. In the former case each member is more or less responsible for performance as his role is vital to the team outcome; however, in the

latter case one star player can lead the team and the team outcome can be perceived as resting on this one individual, allowing Hypothesis 4 to be clearly tested. In addition the level of play, a recreational league, allowed for variance in self, transpersonal, and collective efficacy, while providing a skilled enough environment where individuals could link their intentions to behavior (e.g. If I want to pass the ball to my teammate, I can).

The purpose of Study 4 was to replicate and extend the investigation in classroom work teams. Teams were instructed to act as consultants on Harvard Business Review cases and present their recommendations in the form of a written paper and oral presentation to their classmates and teaching assistant. Like basketball teams, in these work groups interaction was necessary for performance, task interdependence and efficacy perceptions were allowed to vary, and the task was seen as important by participants since performance accounted for their final project grade in the course. However, more importantly, there was one prominent difference between the basketball teams and course groups: In class groups working over time effort can be exerted both within a group context (i.e., during meetings) and outside of it (i.e., doing individual research). This allowed an interesting opportunity to study the validity of the hypotheses both when groups are directly interacting and when members are working coactively towards a common goal. This is important since the proposed model is hypothesized to act as an effort allocation mechanism. Within the group context, members cannot simultaneously exert effort in the same manner. For example, if one group member uses a period of time to address the group another cannot. Conversely, outside the group context, all members can use to the same time period to congruently act towards group goals; therefore an effort allocation mechanism may not be necessary. This distinction allowed for the model to be specifically tested as a mechanism by

which group effort is allocated, while concurrently examining the group context as a possible moderator on the influence of the proposed model.

## Study 3

### Participants

70 players on 22 teams of three or four participated in the study for a DVD of their games. Four player teams used one substitute since only three team members were allowed on the court at one time. Teams were made up of college students, faculty, and staff. The teams played in 49 total tape recorded games. All players were male (*M*age = 20.0). In addition, players had an average of 6.42 (*SD* = 4.02) years of competitive basketball experience.

### Procedure

Participants played a five game season spread over two weeks, followed by a sixteen team playoff. The focus of this study was behavior in the second regular season week of games. These five games were spread over the two weeks so that half the teams in the league played three games the first week and half played three the second week. After the first week of league play, teams were recruited to complete an online survey before the next week. This was done by collecting the e-mails of players after the first week of games and individually emailing them the survey three days before the second week of games. Teams were only counted if all members completed the survey. All members of twenty-two of the thirty-six teams in the league completed the survey prior to the second week of games. There was no difference in the winning percentage of teams that completed the survey as compared to those who did not. The survey was composed of questionnaires including those concerning: self-efficacy, transpersonal efficacy, collective efficacy, and task interdependence. The questionnaires are described in detail below. Although the hypotheses solely concern transpersonal efficacy, data on self and collective efficacy were

also collected, since self-efficacy is one of the mechanisms proposed to be responsible for efficient effort allocation, and both have been heavily cited in previous studies. These measures will be described below. After completing the measures, the following week's games were video-taped and behaviors were coded in a manner described below. Specifically, in order to test the hypotheses, behaviors were divided into those which constituted effort allocation level and those with constituted effort allocation direction.

## Measures

### Task Interdependence

Task interdependence was measured with a five item scale based on the recommendations of Wagemen (1995). Participants were asked to answer questions such as, "my contribution to the team outcome could be replicated by other members," on a scale from 1 (*Completely Disagree*) – 7 (*Completely Agree*).

### Efficacy

The self and collective efficacy scales used in the current study were created and validated by Bray, Brawley, and Carron (2002). Both scales contained the same questions with the exception of pertaining to either the self or the team. Additionally, a transpersonal efficacy scale was adapted by focusing the questions on specific members of one's team other than the self. Each team member filled out one self-efficacy measure and one collective efficacy measure. Each member also filled out one transpersonal efficacy measure regarding each of their teammates. Each scale consisted of 19 questions representing offensive skills (10) and defensive skills (9). The skills represented by these items were based on the recommendations of expert collegiate varsity basketball coaches. Offensive skills included the abilities to pass, dribble, shoot from various distances, and rebound. Defensive skills included items concerning playing man-to-

man and zone defense, defending various positions on the court, blocking shots, and getting into passing lanes. Players were asked how confident they were in their own/their team's/their teammate's ability to perform each skill effectively during games on a scale of 0% (*Not at all Confident*) to 100% (*Completely Confident*). For the analyses these scores were averaged to create composite representations of individuals' efficacy perceptions of themselves, their teams and their teammates.

**Effort Allocation**

Three rates viewed the 49 games and classified the behaviors within each game based on their relation to effort allocation level, direction, and efficiency. These raters were familiar with the game of basketball. Coders were unaware of any hypotheses at the time they coded the tapes. Because motivation involves the processes that cause behavior (Mitchell, 1982), observable behaviors were used to measure effort allocation level, direction, and efficiency. First, individual behaviors were aggregated to create an individual effort allocation level measure. This measure consisted of adding the number of times a player took a shot, got a rebound, got a block, or got a steal, during each individual game. Players were coded as taking a shot anytime they threw the ball towards the basket. Players were coded as obtaining a rebound anytime they caught a shot that had not gone into the hoop. Players were coded as blocking a shot when, on defense, they deflected the ball when an opposing player made a shot, preventing the ball from going through the hoop. Players were coded as getting a steal when, on defense, they gained possession of the ball from the other team, when the other team was not taking a shot. For example, players stole the ball by intercepting passes or disrupting the dribble of opposing players. The reason that these behaviors were chosen is that each one constitutes a statistic accumulated in the absence of other team members. In addition, each behavior constitutes effort on the part of the player.

Next, sharing behaviors were aggregated to create a measure of effort allocation direction. This measure consisted of the aggregate number of times a player passed the ball to another player, set a screen for another player, or switched the player he was guarding when screened on defense. A player was coded as passing the ball when they threw the ball the direction of another player. Setting a screen was coded as anytime a player stood still to block the defender guarding one of his teammates. Finally switching on a screen was coded as anytime, on defense, a player switched the person they were guarding because of a screen. These behaviors were chosen because they were considered a totality of unmistakable behaviors which involve allocating one's own individual effort to a teammate. Finally, shooting percentage, the proportion of shots made to shots taken, was used as an individual efficiency measure since it provides a clear example of how an individual uses the resources (i.e. the ball) they obtain in the game. Disagreements in coding were resolved by discussion between the coders. However, since coders were counting blatant behaviors interrater reliability exceeded 95% for all categories.

**Results**

The final data used for analysis included 70 players nested within 22 teams. This nested structure of the data violates the assumption of independence of observation, made in ordinary least squares (OLS) regression. Therefore, I used hierarchical linear models to analyze the data (Raudenbush & Bryk, 2002). Hierarchical linear modeling (HLM) techniques are needed to provide unbiased estimates of standard errors for hypothesis testing (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999), when the observations are independent. Additionally, HLM allows variance to be partitioned into group and individual effects. Partitioning out group effects yields cleaner estimates of the individual effects of focal variables. In the context of my research, this means that HLM can provide better estimates of not only differences which may exist across

basketball teams in general, but also estimates of player differences in self-efficacy, task interdependence, transpersonal efficacy, and effort allocation.

Means and zero-order correlations between Study 3 variables can be seen in Table 5. Hypotheses 1 and 2 predict that transpersonal efficacy directs the level of individual effort allocation in teams. In order to test these hypotheses, first, a hierarchical null model was conducted to examine the variance in the dependent variable, participants' aggregate individual behaviors (shots, rebounds, steals, and blocks). The intraclass correlation (ICC), which measures the level of interdependence of the data within nesting unit, was .84, indicating that 84% of the variance within individual behavior can be explained by within-subjects differences. This result demonstrated a strong need for using a multilevel modeling approach.

Initially, time was added to the model as a control variable because players who played longer had more of an opportunity to accumulate statistics. Next, self-efficacy, transpersonal efficacy, others' transpersonal efficacy in a focal individual, and collective efficacy were added to the model. As can be seen in Table 6, and as predicted, controlling for time played, only the amount of transpersonal efficacy one had in another ($\beta_{TEinOthers}$ = -.05, t (68) = -2.34, p = .02), along with the amount of transpersonal efficacy others had in the focal individual ($\beta_{OthersTE}$ = .09, t (68) = 4.45, p < .01), were related to individual in-game behavior. Further, the relationships were in the hypothesized directions.

To assess the amount of variance in the model explained, both within and between teams, by transpersonal efficacy in others and others' transpersonal efficacy in the self, each variable was added to the null hierarchical linear model one at a time. First, participant's transpersonal efficacy in others was added to the model and was shown to account for 2.4% of the within-team variance, and .4% of the between team variance, in individual basketball behavior. Then,

Table 5

*Correlations and Descriptive Statistics for Study 3*

| Variable | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1. Transpersonal Efficacy in Others | 73.39 | 13.20 | ---- | | | | | |
| 2. Others Transpersonal Efficacy in the Self | 73.52 | 13.25 | 0.06 | ---- | | | | |
| 3. Self-Efficacy | 72.19 | 11.34 | 0.20* | 0.31** | ---- | | | |
| 4. Collective Efficacy | 72.05 | 12.08 | 0.49** | 0.12* | 0.20** | ---- | | |
| 5. Aggregate Effort Allocation Level | 9.81 | 5.48 | -.15** | 0.14* | -0.04 | 0.05 | ---- | |
| 6. Aggregate Helping Behavior | 5.16 | 3.87 | 0.22** | 0.01 | -0.02 | 0.09 | .36* | ---- |

*p<.05 **p<.01

Table 6

*Predictors of Effort Allocation Level in Study 3*

| | γ | *SE* | *T*-value | |
|---|---|---|---|---|
| Intercept | -4.89 | 2.92 | -1.67 | |
| Time Played | 0.014 | 0.001 | 11.98 | ** |
| Self-Efficacy | -0.006 | 0.025 | -0.228 | |
| Collective Efficacy | 0.044 | 0.026 | 1.704 | |
| Transpersonal Efficacy in Others | -0.052 | 0.023 | -2.34 | * |
| Others Transpersonal Efficacy in the Self | 0.093 | 0.021 | 4.45 | ** |

*p<.05 **p<.01

*Note:* ICC of Effort Allocation Level = .84

teammates' transpersonal efficacy in a focal participant was shown to account for an additional 12.8% of the within-team variance, and an additional 3.2% of the variance of the between-team variance in those behaviors. Finally, once time played was taken into consideration the full model explained 33.0% of the within-team variance and 68.0% of the variance in between-team shots, rebounds, blocks, and steals. Thus, hypotheses 1 and 2 were supported.

Hypothesis 3 predicted that in addition to regulating the level of individual effort allocation in groups, transpersonal efficacy would predict the direction of that effort. To test this, an identical analysis was conducted as was used to test Hypotheses 1 and 2, only this time the dependent variable was the aggregate number of shared behaviors between the focal individual and a target. As can be seen in Table 7, the ICC of the null model for shared behaviors was .89, again indicating a strong need for a multilevel modeling approach. Once all four efficacy variables and time were again added to the model, and again controlling for time played, only transpersonal efficacy was related to sharing behavior as individuals passed the ball more, set more screens, and switched on more screens, with those in whom they had high transpersonal efficacy, $\beta = .124$, $t(68) = 5.14$, $p < .001$. Then, transpersonal efficacy in others was added to the

null model alone, and shown to account for 20.0% of the within-team variance in sharing behavior, and 8.5% of the between-team variance. Again, it should be noted that taking

Table 7
*Predictors of Effort Allocation Direction in Study 3*

| | γ | *SE* | *T*-value | |
|---|---|---|---|---|
| Intercept | 3.367 | 1.325 | 2.541 | * |
| Self-Efficacy | 0.002 | 0.029 | 0.062 | |
| Collective Efficacy | -0.052 | 0.032 | -1.629 | |
| Transpersonal Efficacy in Others | 0.124 | 0.024 | 5.136 | ** |
| Others Transpersonal Efficacy in the Self | 0.039 | 0.027 | 1.475 | |
| Time Played | 0.002 | 0.001 | 1.660 | |

*p<.05 **p<.01
*Note:* ICC of Effort Allocation Direction = .89

transpersonal efficacy into account, neither self-efficacy, collective efficacy, or the amount of transpersonal efficacy one's teammates had in them predicted effort allocation direction, supporting Hypothesis 3.

In order to test Hypothesis 4, it was assumed that self-efficacy would dictate effort allocation efficiency as individuals have a tendency to use resources in tasks they believe themselves to be skilled at (Bandura, 1997). Corroborating past social cognitive results, this was the case. First, the ICC of shooting percentage was .65. Then, when shooting self-efficacy, transpersonal efficacy, transpersonal efficacy in a focal individual, and collective efficacy were added to the model, only self-efficacy had a significant relationship with shooting percentage, $\beta$ = .237, $t$ (68) = 3.13, $p$ =.002, accounting for 4.4% of the variance in within-team shooting percentage and 7.9% of the between-team variance.

This finding indicates that individuals allocate their effort towards subtasks in which they are highly efficacious and sets the stage for investigating Hypothesis 4, that aggregate transpersonal efficacy creates more efficient effort use when task interdependence is high. This was the case. The interaction between self- efficacy and task interdependence was positively

related to transpersonal efficacy in a focal individual, $\beta = .278$, $t\ (68) = 4.93$, $p < .001$, accounting for 9.4% of the within team variance in it, and 4.6% of the between-team variance, indicating that as task interdependence increased self-efficacy better predicted others' transpersonal efficacy in oneself. See Figure 5.

**Discussion**

The purpose of study 3 was to test the hypotheses in a controlled environment where the focal variables could vary, and both individual motivation level and direction could be measured behaviorally. The findings supported all hypotheses and provide evidence that aggregate

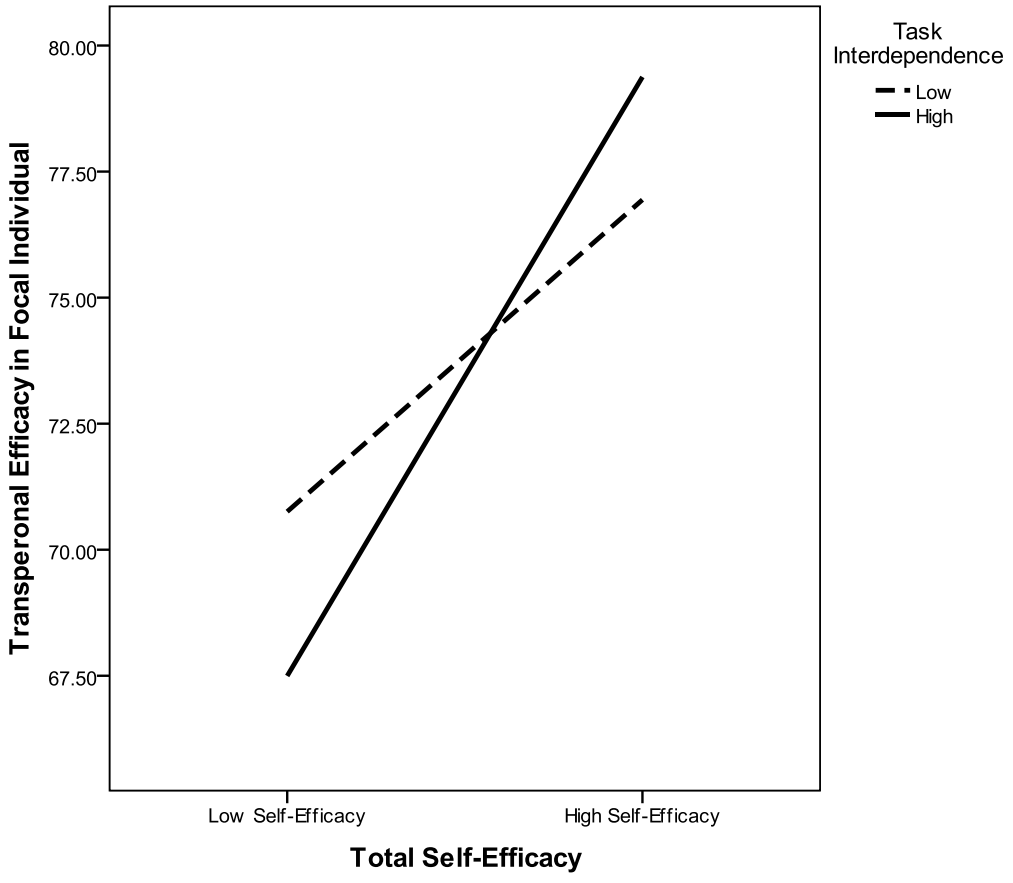


*Figure 5.* How task interdependence influences the relationship between self-efficacy and transpersonal efficacy. Evidence from Study 3.

transpersonal efficacy is associate with within-team effort allocation. First, transpersonal efficacy was found to influence individual effort allocation level. Further, since both a player's transpersonal efficacy in others and other's transpersonal efficacy in him were significant predictors of effort, it appears that individuals develop at least partially congruent transpersonal efficacy perceptions over time and those who engender higher transpersonal efficacy put more effort towards group performance than those who do not. In addition, self-efficacy was shown to influence effort efficiency and to interact with task interdependence to predict transpersonal efficacy. These findings indicate that although transpersonal efficacy hierarchies affect effort allocation, they do not influence efficiency, and groups will not allocate effort efficiently unless they utilize that effort to distribute resources to their most skilled members. Finally, it appears that task interdependence is a tool which can facilitate this process because group perceptions of transpersonal efficacy were better linked to individual's self- efficacy in groups who perceived the task as more interdependent.

In sum, Study 3 provided initial evidence that the network of self-efficacy, transpersonal efficacy, and task interdependence perceptions that exist within a group influences both the effort allocation level, and the effort allocation direction, of the members who compose those groups. Study 4 builds upon this result by replicating it in classroom work teams and by investigating whether these relationships hold outside of group contexts.

## Study 4

### Participants

154 students on 36 teams of between three and six members from a large northeastern university participated in the study for extra credit (72 male, 82 female, *M*age = 19.4). All students were members of the same introduction to organizational behavior class.

## Procedure

As part of the course students were assigned to teams randomly and were required to complete an analysis of a Harvard Business Review case. This analysis contain both a presentation and written report and accounted for 20% of each student's grade in the class. Groups were assigned in the sixth week of the course and students were given until the final week of the semester to complete their assignments. Therefore groups had a nine week period in which to work. All measures were given as a part of an online survey administered three days before groups made their presentations and turned in their papers. In addition, the grade participants received on the project was used to link the dependent motivational measures to a behavioral outcome. All measures are described below.

## Measures

### Task Interdependence

To measure task interdependence the same scale was used as in Study 3.

### Efficacy

To measure efficacy participants were asked to rate their confidence (*0%-100%*) that they, each individual teammate, and their team, could achieve each grade from A+ (97-100) to F (56-59). This method is recommended by Bandura (1997) to measure efficacy because it captures information on both the level of efficacy beliefs (what grade individuals believe they can obtain) and their strength (how confident they are in these beliefs). After completing this measure both efficacy components were combined into a composite measure by multiplying the level of efficacy belief by its strength and aggregating the results.

### Effort Allocation Level

As stated, the group project provided an environment to measure two specific types of effort allocation, mainly effort allocated within and outside of the group context. In order to measure effort allocation level outside of group interaction, participants were asked to "please list how many hours you, individually, spent working on the project without the other group members present." In addition, participants were asked to list how many hours they spent working with the group to get a more general idea of the total amount of time each group spent on the project. In order to measure how much time each individual group member used within each group meeting, participants were asked to "please think of the instances when your group met with all group members. Take a minute to think back to these meetings, think how long they were, what was discussed, and who said what. Now, please list the amount of time that you spent speaking in the group meeting out of the total amount of group meeting time you just listed." Using time on task as a measure of effort is well validated and has often been used previously (e.g. Fisher & Ford, 1998; Sitzmann & Ely, 2010; Tabak, et al., 2009). Still, it is not perfect, as one can put more or less effort into each time unit (Trautwein, 2007). Due to this concern, checks were conducted to make sure time studying was an appropriate effort measure. Specifically, the strong relationship between time spent studying and performance both in the group context, $r(152) = .31$, $p<.01$, and outside of the group context, $r(152) = .36$, $p<.01$, indicates that individuals did not waste their time on the task, as each hour spent working was associated with greater performance. Overall, given the established validity of this measure, confirmed by the checks detailed above, time on task was considered the best method to directly measure the amount of effort put forth on the task.

**Effort Allocation Direction**

In a project such as this, the main form of help came in using one's time to assist others and exchanging information with them. Therefore, participants were asked about both. Specifically, participants were asked to list the amount of time, in hours, they spent "giving information to or helping" each other group member.

### Performance

Performance was operationalized as the grade each group earned on the project. The project consisted of two parts, each analyzing the same Harvard Business Review case. The first component was a paper which accounted for 75% of the total grade. This paper focused on students' abilities to gather relevant information concerning the case, analyze that information, and create solutions for their focal company's problems using organizational behavior concepts. In addition, groups presented their cases in class. The presentation of the case comprised 25% of the group grade. Twenty-five percent of the presentation grade was based on the ratings of participants' observing classmates, and 75% was determined by the group's teaching assistant. Since this was the final project of the semester this format was used to ensure thorough knowledge of organizational concepts as judged by each group's professor, teaching assistants, and fellow classmates, and therefore was seen as an appropriate behavioral dependent measure for the current study.

## Results

The final data used for analysis included 154 students nested within 36 teams. Again, this nested structure of the data violated the assumption of independence of observation, made in ordinary least squares (OLS) regression. Therefore, like in Study 3, I used hierarchical linear models to analyze the data (Raudenbush & Bryk, 2002). Means and correlations between Study 4 variables can be seen in Table 8.

Table 8

*Correlations and Descriptive Statistics for Study 4*

| Variable | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Transpersonal Efficacy in Others (ratio) | 87.12 | 18.09 | ---- | | | | | | |
| 2. Others Transpersonal Efficacy in the Self | 87.93 | 13.25 | -.11* | ---- | | | | | |
| 3. Self-Efficacy | 90.61 | 10.87 | 0.09 | 0.12* | ---- | | | | |
| 4. Collective Efficacy | 94.32 | 7.07 | 0.33** | -.10* | 0.13* | ---- | | | |
| 5. Time working in the group context | 3.90 | 2.83 | -.13* | 0.25** | 0.97 | 0.02 | ---- | | |
| 6. Time working outside the group context | 14.16 | 10.16 | -.01 | 0.01 | 0.31** | 0.11* | 0.30** | ---- | |
| 7. Time Sharing | 1.28 | 1.02 | 0.38** | 0.01 | -.03 | -.03 | 0.01 | 0.03 | ---- |

*p<.05 **p<.01

First, transpersonal efficacy's influence on effort allocation direction, and thus Hypothesis 3, was analyzed. Transpersonal efficacy was expected to predict effort allocation direction across contexts. The ICC of effort allocation direction indicated that 71% of the variance within it could be explained by within-subjects differences. This result demonstrated a strong need for using a multilevel modeling approach. When self-efficacy, transpersonal efficacy in others, others transpersonal efficacy in the self, and collective efficacy were added to the model, only transpersonal efficacy in others accounted for a significant portion of variance in effort allocation direction, $\beta_{TEinOthers} = -.32$, $t\ (152) = 8.13$, $p < .001$. Further, transpersonal efficacy in others was shown to account for 21.1% of the within-team variance in it, and 33.9% of the between-team variance. Clearly, classroom group members spent more effort assisting those in whom they had higher transpersonal efficacy.

Second, when team members were in a group setting and thus limited by key resources they were expected to allocate effort based on transpersonal efficacy, as was the case with the basketball teams in Study 3. This happened. As can be seen in Table 9, within meetings, variance in effort allocation level (ICC =.66) was only accounted for by one's transpersonal efficacy in others, $\beta = -.228$, $t(154) = -3.37$, $p = .001$, and other's transpersonal efficacy in the self, $\beta = .182$, $t = 3.67$, $p < .001$, while both self and collective efficacy were not predictive of within-group motivation.

However, as can also be seen in Table 9, this was not the case when it came to individuals applying effort to the group outcome outside the presence of other group members. In these situations, self efficacy accounted for 21.0% of the within-group variance, and 6.1% of the between-group variance, in effort allocated to the task (ICC = .72), $\beta = .311$, $t = 7.22$, $p < .001$, while transpersonal and collective efficacy did not account for a significant amount. This

result identifies a potential moderator of the effects of transpersonal efficacy on effort allocation which will be further elaborated in the discussion. Thus, Hypotheses 1 and 2 were partially supported, dependent on whether group members were interacting.

Table 9
*Predictors of Effort Allocation Level in Study 4*

| | γ | *SE* | *T*-value | |
|---|---|---|---|---|
| Within Group Effort Level | | | | |
| Intercept | -5.764 | 9.922 | -0.581 | |
| Self-Efficacy | 0.053 | 0.051 | 1.056 | |
| Collective Efficacy | -0.056 | 0.070 | -0.794 | |
| Transpersonal Efficacy in Others | -0.228 | 0.068 | -3.365 | ** |
| Others Transpersonal Efficacy in the Self | 0.182 | 0.049 | 3.673 | ** |
| Outside of Group Effort Level | | | | |
| Intercept | -11.687 | 9.538 | -1.225 | |
| Self-Efficacy | 0.311 | 0.043 | 7.219 | ** |
| Collective Efficacy | 0.011 | 0.062 | 0.175 | |
| Transpersonal Efficacy in Others | 0.015 | 0.023 | 0.640 | |
| Others Transpersonal Efficacy in the Self | -0.047 | 0.047 | -1.007 | |

*p<.05 **p<.01
*Note:* ICC of Within Group Effort Allocation Level = .66, ICC of Outside of Group Effort Allocation Level = .72

Since the previous analysis found that transpersonal efficacy only predicted effort allocation level within-groups, the following investigated whether this pattern held for effort allocation efficiency. Perhaps unsurprisingly, it did. First, it is important to note that the interaction of self-efficacy and task interdependence accounted for 19.9% of the within-group variance, and 41.5% of the between group variance in others' perceptions of transpersonal efficacy in oneself (ICC = .43) across the task, $\beta = .144$, $t = 5.51$, $p < .001$, supporting Hypothesis 4.

However, this alignment of self-efficacy and transpersonal efficacy only influenced effort allocation efficiency through within-group effort. This was tested by conducting analyses to determine if the effect of within-group effort on performance was explained by the absolute value of the difference between self and transpersonal efficacy. This variable was created so that higher values indicated more of a mismatch between self and transpersonal efficacy. To conduct this analysis, this difference, within group effort, and between group effort, were averaged across group members since performance, the dependent variable, was at the group level (Rousseau, 1985). Then regression analysis was conducted. When tested alone, both effort allocation within the group, $\beta$ = .099, $t$ = 1.97, $p$ =.050, and outside of the group, $\beta$ = .128, $t$ = 2.58, $p$ =.010, predicted group performance. However, once task interdependence was added to the model within-group effort became an insignificant driver of performance, $\beta$ = .073, $t$ = 1.42, $p$ =.155. In this case only the amount of difference between self and transpersonal efficacy, $\beta$ = -.218, $t$ = 3.85, $p < .01$, and outside of group effort, $\beta$ = .075, $t$ = 3.05, $p < .01$, drove performance. This finding indicates that the alignment of self and transpersonal efficacy only influences effort allocation efficiency, operationalized in this study as performance, through within-group effort allocation.

**Discussion**

Study 4 was conducted to extend the findings of Study 3 by investigating the impact of transpersonal efficacy on individual team member's effort both within and outside of the team context. Just as in Study 3, it was found that within a team context transpersonal efficacy predicted effort allocation level and direction and self-efficacy predicted effort allocation efficiency. Further, across contexts it was found that task interdependence allowed for self-efficacy to predict transpersonal efficacy.

However, the findings concerning effort allocation outside of the group context did not support the hypotheses presented. Still, these results are helpful in that they identify a possible moderator of the effects hypothesized. In particular, it seems that group contexts increase the need for transpersonal efficacy to determine effort allocation. In the group contexts studied, natural boundaries existed which prevented all group members from exerting their effort towards the task in congruent ways. In basketball if one member is controlling the ball, the others must exert the effort without this key resource. Similarly, in group meeting is one person is exerting their effort towards speaking, others cannot. In such situations, where one member exerting their effort in one direction precludes other members from doing so, tradeoffs must be made necessitating transpersonal efficacy as an effort allocation mechanism. Further, this allows self-efficacy to function in role where it regulates the efficiency of the effort allocations.

This is important because in many situations involve finite resources necessitating team members differentiating their effort allocations, some examples include money, time, or a task specific resource such as the ball in basketball. Still, in other situations, funding, time, or other resources may be more than sufficient to complete a given task. In these situations the restrictions on how team members cannot allocate their effort are loosened, and distribution mechanisms are not as necessary. Further, it was found that in such situations self-efficacy positively predict individual effort, replicating previous findings (Bandura, 1997).

## General Discussion

Group members are consistently inefficient in the level and direction of effort they allocate towards group tasks (Karau & Williams, 2001; Stasser & Titus, 2003). These problems are significant in scope, and their importance is compounded in organizations due to the large and increasing number of group tasks found within them (Devine, et al., 1999; Gully, et al.,

2002; Guzzo & Shea, 1992). The current study used social cognitive and expectancy theories, explicitly the constructs of self-efficacy, transpersonal efficacy, and task interdependence, to explain, and provide a path to amend, these issues.

Specifically, transpersonal efficacy was predicted to account for the amount and direction of effort each group member devoted to a group task and self- efficacy was predicted to regulate the efficiency of these actions. Study 3 found support for these predictions in the context of basketball games. In games, team members allocated effort to other group members based on their transpersonal efficacy in those group members, and both this and others' transpersonal efficacy in a focal member, predicted the quantity of individual effort allocated in the game. Self-efficacy also predicted shooting percentage, a clear measure of effort allocation efficiency. Finally, task interdependence moderated the relationship between self-efficacy and transpersonal efficacy, such that self-efficacy only predicted transpersonal efficacy when teams perceived their task as task interdependent, that is, teams efficiently shot the basketball only when task interdependence was high. Study 4 replicated these findings in the within-group portion of group project teams. Thus, when time was limited, self-efficacy, transpersonal efficacy, and task interdependence regulated both effort allocation level and efficiency. However, this finding did not hold outside of the group context.

The key difference in the task environment when group members are interacting, as opposed to when they are not, is the ability of multiple group members to exert effort in identical ways. When individuals are in a group, resources must be shared, and this creates a zero-sum context. In other words, when there is a limited amount of a specific resource available to a group, if one member exerts effort to uses that resource it takes away from the amount of effort another member can exert towards using it. In the current study, the two examples used are the

basketball and time. In a basketball game if one member has the ball, others cannot. In a group meeting two people cannot effectively speak at the same time, so only one person can use a given period to seek or exchange information. These situations necessitate a mechanism for the differentiation of effort allocation among group members. As stated, the current study found evidence that transpersonal efficacy acts in such a role. This is important as most, if not all, groups tasks involve some resources which are inherently limit member effort allocation, such as time, money, or a specialized piece of technology.

However, when the need to differentiate effort is eliminated, as is the case when individuals are not interacting and therefore can all concurrently exert effort in congruent ways, transpersonal efficacy fails to regulate effort allocation. For example, in Study 4, when individuals were not in a group meeting they could all use the same time period to conduct separate research on their assigned topics, therefore no tradeoff was necessary and transpersonal efficacy did not influence time devoted to the task. This potential moderator of the influence of transpersonal efficacy on effort allocation provides an interesting opportunity for future research. Specifically, the distribution of effort is not always in the hands of group members. Distribution mechanisms such as organizational leaders may control how many and which tasks particular group members are responsible for. In such situations the need for efficacy networks as a means to distribute effort allocation may be attenuated.

**Limitations and Directions for Future Research**

As is the case in any study, certain design characteristics of the current study were limited in favor of others. Exploring these limitations allows consideration of many interesting avenues for future research. Most prominently, in order to provide better control, neither study involved groups embedded in larger organizational contexts where external constructs can influence focal

variables. Still, such variables can be expected to have significant influence on effort allocation within groups. Specifically, variables such as power position within a firm and organizational culture can be expected to affect both transpersonal efficacy perceptions and the effort allocation within a group environment. We know that perceptions of power and status are associated with greater influence in group environments (Littlepage, Schmidt, Whisler, & Frost, 1995). It can therefore be expected that organizationally derived status and power could influence transpersonal efficacy perceptions such that those with more power or status are seen as more capable and thus are given more help. In addition, aspects of organizational culture may affect the behavior of group members within organizations. For example, in a culture high in psychological safety, where individuals feel comfortable taking interpersonal risks (Edmondson, 1999), group members may take greater risks and communicate more, allowing both more accurate and more shared assessments of their abilities.

Still, despite my inability to study these factors in the current paper, organizations contain groups which closely resemble those investigates in the studies reported. The most salient example of these types of teams are action teams, or teams which come together for a short time to complete a specific goal (Sundstrom, et al., 2000). Examples of action teams include military combat crews, flight crews, surgery teams, and other highly specialized performance groups (Sundstrom, et al., 2000). Moreover, the results found can be transferred to the myriad of other small task-specific groups which exist in organizations (Guzzo & Dickson, 1996).The results of the current studies indicate that in such groups fostering high task interdependence, along with accurate transpersonal efficacy networks, will allow team members to efficiently allocate their effort and thus facilitate the performance of their teams. This is important due to the prevalence

of such groups and the specialized and varied tasks they perform (Sundstrum, De Meuse & Futrell, 1990).

In addition, the current study did not assess the possible influence of group size on efficacy networks. In the efficacy networks studied each group member was able to create an efficacy perception of each other group member due to the maximum size of the groups studied being six. However, in larger groups, it is possible that each member may not be able to concordantly consider each other group member when making effort allocation decisions. It would be interesting and practical to study how the supported hypotheses operate in larger group contexts. It may be the case that individuals satisfice in the number of resources and individuals they take into consideration when making these decisions; however it may also be the case that individuals no longer utilize specific transpersonal efficacy, but rather view other group members as a whole and assesses their efficacy as such. In such situations collective efficacy may become more predictive of effort allocation than transpersonal efficacy.

Finally, although the current study is limited to the study of aggregate transpersonal efficacy in group environments, these perceptions may be applicable in situations other than those involving groups. Take the example of a large competitive environment, such as that present in the board game Risk. In such scenarios it is highly probable that transpersonal efficacy exists in the same manner as in groups working towards a common goal, but has opposite effects on effort allocation level and direction. In a competitive scenario, where multiple parties are competing to obtain a desired outcome, it behooves an individual to keep resources away from those in which they have high transpersonal efficacy in order to increase their own chance of obtaining the desired outcome, therefore high transpersonal efficacy may lead to attempted

subterfuge instead of helping. Investigating transpersonal efficacy outside of group contexts therefore provides another interesting opportunity for future research.

Groups consistently encounter problems when attempting to combine the efforts of their individual members. Two of the largest streams of research of this topic concern deficiencies in how much effort is allocated to a group task (e.g. Karau & Williams, 2001) and in what ways that effort is allocated (e.g. Stasser & Titus, 2003). The current paper highlights the role of social cognitive and expectancy theories in combining these two lines of research by explaining how within-group efficacy perceptions and task interdependence can dictate both the amount of effort allocated to a group task and how that effort is allocated. In order to do this transpersonal efficacy was investigated alongside self and collective efficacy. Further, task interdependence was shown to moderate group effort allocation efficiency, and resource scarcity was shown as a possible moderator of the hypotheses made. Due to the importance of this conceptualization, it is hoped that this study is seen as an initial step into the investigation of the multiple interacting efficacy perceptions which exist in groups, and inspires others to investigate the importance of these perceptions over time and outside of group contexts.

**How expectancy motivation influences information exchange in small groups**

Groups are often chosen to make decisions instead of individuals because of their greater knowledge base and the diversity of their members' perspectives. However, a multitude of studies have shown that collectives often fail to exploit their potential because groups are unable to utilize the specialized knowledge of their members. Instead, group members tend to share information they commonly hold (Mesmer-Magnus & DeChurch, 2009; Wittenbaum, Hollingshead & Botero, 2004). This presents a severe problem when its effect on the efficiency of problem solving is considered. When individuals are aggregated in an attempt to combine

knowledge and perspectives, it may result in the discussion of even less information than a single person would utilize since the common set of information present between two individuals must be less than the amount held by either alone.

Due to the implications of these findings, several avenues of research have begun to examine mechanisms that increase the efficiency of group information exchange (e.g. Galinsky & Kray, 2004; Postmes, Spears & Cihangir, 2001; Stewart & Stasser, 1995). One of the most fruitful of these streams has integrated research on expertise awareness (Lewis, et al., 2007) with that on group information sharing. Specifically, research has uncovered that when group members are aware of each other's domains of expertise they are more likely to query about those domains and thus expose and discuss uniquely held information, thereby increasing group problem solving efficiency (Stewart & Stasser, 1995; Stasser, Stewart & Wittenbaum, 1995).

Despite the abundance of research supporting the role of expertise awareness in increasing the effectiveness of group decision making (Peltokorpi, 2008), few studies investigate *why* group members use others expertise to the benefit of group decision making. This is a pressing issue since research has found that social factors present in groups can limit group member information exchange, e.g., coworkers dislike for each other (Casciaro & Lobo, 2005; 2008; Hollingshead, Jacobsohn, & Beck, 2009). In other words, people will not use others' knowledge if they are not motivated to do so.

Therefore, I propose that in addition to knowing who knows what within a group, group members' motivation to exchange information with each other plays a vital role in group decision making. Expectancy theory states that individuals desire for specific rewards (valence), perception of the link between their own actions and receiving those rewards (instrumentality), and belief that they can complete the behaviors necessary to receive those rewards (expectancy)

drives their effort towards completing tasks (Vroom, 1964). In groups, members' instrumentality towards the outcome is attenuated since each other group member requires some credit for the group performance. This attenuation results in lower effort exerted towards group tasks (Karau & Williams, 2001). Further, this tendency for decreased instrumentality to reduce group member effort is much stronger in groups that are not task interdependent, or whose members do not believe the entire group is necessary for performance (Wagemen, 1995). Consequently, expectancy theory provides an exemplary vehicle to study the influence of motivation on group information exchange since it has been shown to affect group environments, and can be easily tracked through task interdependence.

This issue is investigated in a study that explores both expertise awareness and instrumentality as drivers of group decision making. This is done to provide a mechanism that can explain the development of expertise awareness and to parse out the specific influence it has in group decision making scenarios in light of motivational influences. Additionally, this focus on the specific influence of motivation, as compared to expertise awareness, in group decision making, will help to broaden the motivated information processing literature. While it is known that the specific motivations which drive individual behavior can influence the way groups process information (De Dreu, 2007; De Dreu, Nijstad & van Knippenberg, 2008), little work has investigated how the level of group members motivation influences the use of individual information in group decision making.

Therefore, this approach provides a more complete explanation of group decision making because investigating the motivation behind information exchange allows for an explanation of not only *how* groups make better decisions but *why*. In addition, using expectancy theory in conjunction with expertise awareness addresses this issue by exploring when individuals search

out information whose location they are unaware of, and what drives groups to use their members' expertise. Answering these questions is important to providing a more complete picture of group information exchange, and will become more important as decision making groups become increasingly common in organizations (Gully, et al., 2002).

**Expertise Awareness and Group Information Exchange**

As mentioned, groups have a pervasive tendency to neglect the expertise of their members (Mesmer-Magnus & DeChurch, 2009; Stasser & Titus, 1985). However, making group members aware of each other's expertise attenuates this tendency. For example, three person groups have been found to solve hidden profile tasks with three possible choices at a rate of about one third, what one would expect due to random chance (Stassser & Stewart, 1992). Hidden profile tasks involve groups making decisions where the correct choice is *hidden* from each individual member despite the aggregate group having enough total information to choose optimally (Stasser & Titus, 1985). In this way each member receives a subset of information regarding a specific task that is not enough for any individual member to correctly solve it alone. Such scenarios provide good environments to study information exchange and decision making because information can be strictly controlled and measured, and exchange is necessary to make effective decisions (Stasser & Titus, 1985).

It has also been found that when the clues are divided such that each group member's unique information is about one of the three decision outcomes, and the group members are told which outcome every member received unique information about, the solve rate jumps to 61% (Stasser, Stewart & Wittenbaum, 1995). The common explanation for this finding is that when group members are aware of each other's expertise they are better able to coordinate the

processing of information and thus are better able to make effective decision since they know where appropriate information lies (Stewart, Stasser & Wittenbaum, 1995).

While it is recognized that groups need to exchange knowledge to produce tangible outcomes, specific motivational mechanisms that may drive this exchange have been almost ignored. For example, Casciaro and Lobo (2008) provide evidence that interpersonal liking within organizations influences the likelihood of individuals to seek and provide information to each other to the point that individuals will virtually ignore others if their dislike of them is strong enough. Similarly, De Dreu and colleagues (2007; 2008) show that groups who are more motivated to understand their surroundings exchange more information, however this is done in the absence of expertise awareness. Moreover, evidence exist that egocentric goals and distrust of others can limit information exchange within organizations, despite the existence of expertise awareness (Javernpaa & Majchrzak, 2008). These findings indicate that some variance in the impact of expertise awareness on group decision making efficiency may be explained by group members' motivation to use those systems. Expectancy theory provides a platform to examine this motivation and thus explain instances when individuals will be likely to utilize expertise because they desire to do so.

**Task Interdependence, Instrumentality, and Information Exchange**

Being in a group can affect people's instrumentality in a few ways. Either the presence of other group members can limit one's own sense of instrumentality since other's who help to complete a task require some credit for performance, or, alternatively, other group members can exacerbate one's own sense of instrumentality by enabling a focal individual to perform. Both reactions can be explained by expectancy theory, although each has distinctive implications for

group information exchange. In addition, I hypothesize that the way other group members affect one's own instrumentality depends on the task interdependence of his or her group.

Groups can be more or less task interdependent based on how necessary each member is perceived to be for the achievement of the group outcome (Wagemen, 1995). When groups have low task interdependence, members perceive each other to be unnecessary for performance, eliciting a situation where a few skilled team members can be responsible for the performance of the entire team. In such situations group members impede each others' instrumentality towards the group outcome. This occurs because when one member completes a subtask and thereby takes responsibility for it, no one else can complete that particular subtask; thus other group members cannot be instrumental towards the group outcome through that particular means (Karau & Williams, 2001). So, in undertakings that are task non-interdependent when one member completes one of the non-specialized task-related behaviors responsible for performance, no one else needs to. In such situations it is not necessary for team members to share information with each other because each member impedes every other's instrumentality towards the group outcome (Karau & Williams, 1993). In fact, evidence exists that when tasks are perceived as having low task interdependence individuals are likely to develop their own knowledge structures without taking other group members into consideration (Wagemen, 1995). In addition, group members in task non-interdependent groups are less likely to seek help from each other (Cleavenger, Gardener & Mhatre, 2007), and are less likely to exchange task relevant information (Katz-Navon & Erez, 2005).

Conversely, in task interdependent groups each member needs each other member in order to be instrumental to the group outcome since each member believes that each other member is necessary for group performance (Wagemen, 1995). In other words, in tasks high in

task interdependence each member is necessary to each other member's instrumentality since having one incompetent member makes one's own effort moot. So, because individuals desire to exert effort in tasks with worthwhile rewards (Bandura, 1997), in task interdependent endeavors it becomes necessary for members to provide information to, and seek information from, other group members since all are vital to team performance. Indeed, the same studies previously cited have also found that members of task interdependent groups seek help from each other (Cleavenger, Gardener & Mhatre, 2007) and exchange task-relevant information with each other (Katz-Navon & Erez, 2005).

These findings provide evidence of a link between instrumentality and information exchange in groups, however they do not explore the type of information being exchanged. Specifically, they do not investigate whether the information being exchanged is relevant to a focal problem, and thereby do not investigate the benefits of aggregation in decision making. In the hidden profile task being used, this problem-relevant information takes the form of the unique information each member holds concerning the task. So, because task interdependence has been shown to lead to the consideration of characteristics of individual group members (Cleavenger, Gardener & Mhatre, 2007; Katz-Navon & Erez, 2005) and information exchange between group members, it is expected it will lead to the exploration of group member expertise. Therefore, the following hypotheses are made:

H1: Task interdependent groups will exchange more unique information than task non-interdependent groups

H2: Task interdependent groups will make more optimal decisions than task non-interdependent groups

## Study 5

## Participants

One-hundred and twenty students composing 40 three-member groups participated in Study 5. These students were recruited from various organizational behavior and psychology classes at a large northeastern university and participated in the study for extra credit (63 male, 57 female, *M*age = 19.89 years).

## Procedure

These participants were divided into four conditions based on the manipulation of task interdependence and expertise awareness. All groups completed the same murder mystery hidden profile task. To do this, participants first individually read a 27-page booklet describing the circumstances of a murder. The materials included a map, a handwritten note, a newspaper article, and numerous interviews. Among these materials were 24 clues containing either incriminating or exonerating evidence towards each of three subjects labeled E, B, and M. Overall, there were 6 clues incriminating each subject and 3 clues each exonerating B and M. Specifically, the 3 clues incriminating E and the 6 clues exonerating B and M were critical to solving the murder. These 9 critical clues were the ones that created the hidden profile and were distributed 3 each to each team member in a manner such that each team member received the three clues critical to one of the suspects. Participants were then aggregated into their three person groups and asked to solve the mystery. Groups were told they could take as long as they wanted to discuss the case, but that they must come to consensus regarding the killer, and that all groups to correctly solve the case would be entered in a raffle to win $20 per group member. All discussion was videotaped.

Finally, after submitting their answer, each group member completed a questionnaire composed of an expertise awareness manipulation check, and a task interdependence

manipulation check. The expertise awareness check asked each member how much information each group member had, compared to the other members, about each suspect (1 – much less than other members, 4 - the same as other members, 7 - much more than other members). Groups who correctly identified the specific suspect all group members had the most information about were coded as having expertise awareness and those that could not were not. The task interdependence manipulation check asked participants how much the outcome was dependent on themselves (0-100%), and on each of their teammates (0-100%). Finally, in order to ensure the results found were due to this instrumentality difference and not valence or expectancy, the two components of expectancy motivation not hypothesized to be responsible for the results found, two steps were taken. First, valence, the desirability of a reward linked to a specific outcome (Vroom, 1964), in this case the reward for correctly solving the mystery, was held constant. As stated, in each condition groups that correctly solved the mystery were entered into a raffle for $60. Additionally, expectancy was measured and compared between conditions. Expectancy refers to the belief that one's effort will result in a desired performance (Vroom, 1964). Therefore, as an expectancy measure, individuals were asked their confidence in their ability to successfully solve the mystery on a scale of 0-100%.

**Manipulations**

As mentioned, the first dimension manipulated was task interdependence. In order to enact this manipulation a procedure was borrowed from Stasser, Stewart, and Wittenbaum (1995). Specifically, participants in the high task interdependence condition were told, in the presence of other group members, that each one of them had received unique information regarding the case and that each group member would be necessary to solving the case. There were two distinct conditions with high task interdependence. In the first, group members were

told which suspect they had the most information about in front of each other group member (Expert-Public). This was intended to create expertise awareness within the group. In this condition, group members were each told, in front of each other, "your group is about to complete a murder mystery task. Please use the information given to attempt to deduce which suspect has perpetrated the crime. In addition, each of you will be given an expert role about a specific defendant and be given information about that defendant that no one else has." In the second task interdependent condition, participants were given the roles of lead detective, forensic specialist, and eye witness, in front of each other. These roles were chosen because they pertain to the environment surrounding a murder investigation. However, other than this purpose, they were completely random (Random Roles). In other words, they had nothing to do with the information contained in each member's packet. In this condition group members were told together, "Your group is about to complete a murder mystery task. Please use the information given to attempt to deduce which suspect has perpetrated the crime. In addition, each of you will be given a role for the case and will be given information in accordance with that role that no one else has." This second task interdependent condition was novel and was created for the Study 5. Therefore, two high task interdependent conditions were created, one whose groups knew whom each member received more information about, and one who only knew they needed each member to complete the task.

In addition, and again following the work of Stasser, Stewart, and Wittenbaum (1995), one task non-interdependent group was created with expert roles. In this condition, members were told individually that they were experts on whichever suspect their packet contained more information on (Expert Private). Therefore, they were told the same thing as the expert public group, only they were told individually. Furthermore, a control condition was created with no

roles and where participants were not told all members were necessary for performance (Control).

## Coding

First, the group discussions were transcribed from the videotapes that were recorded. Three raters read the 40 transcripts and classified each based on, among other things, the amount of unique information exchanged (out of the 9 total pieces; interrater reliability [IRR] = .92), the number of times group members disagreed, and the number of times group members made information requests of each other. Coders were unaware of any hypotheses at the time they coded the narratives. Specifically, disagreements were defined as any time a teammate specifically told another teammate their idea was incorrect (IRR = .91). For example, in one group, group member A stated, "I think we can rule out (suspect A), he's just too stupid." Then group member B responded, "I don't know about that, he was the last one to touch the [murder weapon]." This clear retort was coded as a disagreement. Additionally, information seeking behaviors were defined as any time a teammate asked another teammate for a specific piece of information relevant to the case (IRR = .94). For example, one participant asked his group, "What did your packets say about [suspect A]?" Disagreements in classification were resolved by discussion between the coders.

## Results

### Manipulation Checks

Two manipulation checks were conducted. In order to do these, hierarchical linear modeling was used because a group level manipulation was enacted to account for variance in an individual level outcome. This setup violates the assumption of independence of observation, made in ANOVAs; however, hierarchical linear modeling (HLM) techniques provide unbiased

estimates of standard errors for hypothesis testing in these situations (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). First, a hierarchical null model (i.e., a model with no predictors at either level) was created to examine how much variance in the dependent variable could be predicted by participants' perceptions of task interdependence. The intraclass correlation (ICC), which measures the level of interdependence of the data within nesting unit, was .72, indicating that 72% of the variance within task interdependence can be explained by within-groups differences. Then, the participants' condition was added to the model to assess whether the task interdependence manipulation was successful. As expected, those in the two task interdependent conditions ($M$ = 78.92, $SD$ = 44.47) believed choosing a suspect was more dependent on their teammates than those in the control and expert private conditions ($M$ = 59.57, $SD$ = 38.05), even when controlling for group membership, $\beta_{TaskInterdependence}$ = 19.35, $t(38) = 2.57$, $p < .05$. Second, expectancy was compared between all conditions. As expected, HLM indicated that condition did not significantly affect team members belief that they, individually, had the ability to solve the murder mystery, $\beta_{Condition}$ = -0.51, $t(38) = -.41$, $p = .68$, ICC = .78. Therefore, the results found cannot be linked to differences in the base ability beliefs of individual team members.

Because the hypotheses involved group level dependent variables, the amount of unique information exchanged by a group as a whole and whether a group solved the problem correctly, HLM could not be used to test them. Instead, ANOVAs were used. Hypothesis 1 predicted that those in the task interdependent conditions would exchange more unique information regarding the case. An ANOVA with a post-hoc Tukey test indicated that indeed this was the case. First, an ANOVA indicated that differences in the amount of unique information shared existed between conditions, $F(3, 36) = 3.33$, $p < .05$. A subsequent Tukey test then indicated that the amount of unique information shared in both the public expert roles ($M$ = 6.27, $SD$ = 1.62) and

random roles conditions ($M$ = 5.94 $SD$ = 1.96) was greater than the amount of information shared in the private expert roles ($M$ = 4.11, $SD$ = 1.73) and control conditions ($M$ = 3.45, $SD$ = 2.61), see Table 10. This finding, along with not finding a difference between the two task interdependent conditions indicates that motivation does play a significant role in information exchange in these sorts of problems, and that expertise awareness cannot tell the entire story of within-group unique information exchange.

Table 10
*Mean Differences in the Murder Mystery Hidden Profile*

| Condition | Random Roles | Expert Public | Expert Private | Control |
|---|---|---|---|---|
| Variable Tested | | | | |
| H1: Unique Information Exchanged | 6.27[a] | 5.94[a] | 4.11[b] | 3.45[b] |
| H2: Solve Rate | 70%[a] | 70%[a] | 40%[b] | 40%[b] |
| Expertise Awareness Percentage | 50% | 70% | 40% | 10% |
| Disagreements | 4.22[a] | 2.01[b] | 1.10[c] | .70[c] |
| Information Requests | 3.89[a] | 2.03[b] | 2.00[b] | 2.30[b] |
| Common Information Exchanged | 36.56[a] | 28.67[b] | 18.45[c] | 22.50[b,c] |
| Other Dependence | 80.91[a] | 77.12[a] | 68.39[a,b] | 49.87[b] |

*Note.* Those cells in all rows except for solve rate with different superscripts have significantly different means, $p < .05$. Those cells in the solve rate row with different superscripts have marginally different means, $p < .06$.

In addition it was hypothesized that the same two task interdependent conditions would solve the mystery more often than the conditions with low task interdependence. Seven of ten groups in both the task interdependent conditions solved the mystery correctly, for a total of fourteen out of twenty, as compared to four of ten groups in both the task non-interdependent conditions, for a total of eight out of twenty. A chi-square analysis confirmed these solve rates

were marginally different, $\chi 2 = 3.64$, $p < .06$, partially supporting Hypothesis 2, see Table 10. Like the previous finding, the clear difference between task interdependent and non-interdependent groups coupled with the non-existence of any difference in solve rate between the task interdependence groups indicates that motivation plays a key role in group decision making and that expectancy theory can help to explain this role.

Then, the role of task interdependence as a driver of these findings was investigated. First, the aggregate level of instrumentality that each group member felt towards the task did not differ between those in task interdependent and non-interdependent groups, $t(38) = .47$, $p = .50$. Combined with the task interdependence manipulation check, this finding supports the theory that those in task interdependent groups allow themselves to feel their teammates are instrumental to group outcomes, without attenuating their own instrumentality. Hierarchical linear modeling further supported this premise. In the two task non-interdependent conditions, participants' own instrumentality inversely predicted how instrumental they believed their teammates were to the group task, $\beta_{Instrumentality} = -0.50$, $t(54) = -3.43$, $p < .01$, ICC = .78. However, no such relationship existed in task interdependent groups, $\beta_{Instrumentality} = 0.16$, $t(54) = 0.69$, $p = .50$, ICC = .78. Therefore, it appears that in task non-interdependent groups, because group members view each other as impediments to their own instrumentality, they cannot allow themselves to believe that both they and their teammates are highly instrumental to group performance. However, task interdependent group members do not suffer from this issue. This finding is important because participant's own instrumentality was found to positively predict unique information sharing across conditions, $\beta_{Instrumentality} = 0.25$, $t(106) = .264$, $p = .01$, ICC = .71.

**Additional Analysis**

In order to further verify the influence of expectancy motivation on expertise awareness development, analysis of differences in the number of groups which had expertise awareness, between conditions, was conducted. As stated, having expertise awareness was defined as a group in which each member correctly identified which suspect they, and each other group member, received the most information about. First, the greatest number of expertise aware groups, 70%, were in the public expert condition. This could be expected as these groups were instructed which member had what information about which suspect. The second greatest number of expertise aware groups, 50%, were formed in the random roles condition. In line with the logic behind Hypotheses 1 and 2, this is believed to be because people in the random roles condition were motivated to exchange information with each other, allowing their expertise to be made salient to the group. Despite each member of the private expertise condition knowing one third of who knew what, by being told that he or she was an expert on one suspect, only 40% of the groups in that condition had expertise awareness. Finally, only one group in the control condition had expertise awareness. Chi-square analysis indicated that the pattern of these differences was significant, $\chi 2 = 7.67$, $p = .05$, see Table 10. Still, it is important to note that, although as many private expert groups had expertise awareness as random roles groups, random roles groups still solved the problem at a significantly higher rate. In combination this evidence lends further support to the proposition that merely having expertise awareness is not enough, group members must be motivated to use it. Task interdependence provided such motivation in the current study.

Since the random roles condition facilitated expertise awareness and produced effective decisions, the investigation of the mechanisms which may have played a role in these relationships warrants investigation. Previous literature has tended to neglect this process

information in favor of solely focusing on the unique and common information exchanged by groups (Lu, Yuan, & McLeod, in press). To this end, differences in other information exchange behaviors were analyzed in reference to the conditions created. Specifically, *disagreements* with teammates and *information requests* were investigated as these two behaviors were assumed to be integral to converging on an appropriate conclusion.

Differences between conditions appeared in both behaviors (Disagreement, $F$ (3, 36) = 7.82, $p < .001$; Information Seeking, $F(3, 36) = 41.79$, $p < .001$) with Tukey tests indicating those groups in the random roles condition averaging both more disagreements ($M = 4.22$, $SD = 2.59$) and information requests ($M = 3.89$, $SD = 2.86$) than those in the other conditions. Concerning disagreements, those in the public expertise condition disagreed with each other more ($M = 2.10$, $SD = 2.18$) than those in the private expertise ($M = 1.01$, $SD = 1.16$) and control conditions ($M = .70$, $SD = .78$), see Table 10. The amount of information requests in the expert public ($M = 2.03$, $SD = 2.04$), expert private ($M = 2.00$, $SD = 1.69$), and control conditions ($M = 2.30$, $SD = 2.72$) were equivalent, see Table 10.

Again, these results point to specific motivated behaviors which may be responsible for the development of expertise awareness, as both task conflict (Jehn, 1995) and the searching out and sharing of information (Mesmer-Magnus & DeChurch, 2009) have been found to greatly increase the performance of decision making groups, especially when making complex decisions. Based on this research it is surprising that groups in the public expert condition both disagreed with each other less, and made fewer information requests, than those in the random role condition, considering both had high task interdependence. However, it may be that once groups have expertise awareness group members do not need to disagree as much as they concede points to respective experts. Still, those in the public expert condition disagreed with

each other more than those in the two task non-interdependent conditions. In addition, once individuals are aware they are experts in a specific area they may volunteer applicable information, making information requests less necessary.

Finally, the exchange of common information was investigated. Because task interdependence was used to increase group member instrumentality, and thus motivation, it is possible that groups made better decisions because they shared more total information, instead of solely unique information. In order to test this possibility, an ANOVA was run and indicated that differences in the amount of common information shared did exist between conditions, $F(3, 36) = 4.95$, $p < .05$. Specifically, those in the two outcome interdependent conditions shared more common information ($M = 32.61$, $SD = 19.21$) than those in the two other conditions ($M = 20.48$, $SD = 13.27$). However, a subsequent logistic regression indicated that only the sharing of unique information led to increased group problem solving, $\beta = .314$, $SE = .129$, $p < .05$. Further, unique information sharing predicted 31% of the variance in whether groups solved the hidden profile correctly, whereas the amount of common information shared was not a significant predictor of group problem solving efficiency, $\beta = -.059$, $SE = .035$, $p = .094$. Therefore, although outcome interdependence increased all types of information sharing, it was the increase in unique information sharing that allows groups to make more efficient decisions. Additionally, a post-hoc Tukey test indicated that those in the random roles condition ($M = 36.56$, $SD = 23.59$) exchanged more unique information that those in the expert public condition ($M = 28.67$, $SD = 12.52$). This indicates that, although groups with higher motivation have the tendency to exchange more common information, this tendency can be attenuated by expertise awareness.

## Discussion

Study 5 was conducted to build upon and extend previous findings concerning information exchange and expertise in hidden profile groups. Specifically, the role of expectancy theory and individual motivation in the development and use of expertise awareness was investigated to explore why expertise is used, and to integrate these lines of research. To do this a hidden profile task was used and both task interdependence and expertise awareness were manipulated.

Initially, I found that only the task interdependence manipulation, which is indicative of perceived instrumentality within groups (Karau & Williams, 2001; Wagemen, 1995), influenced the mention of unique information, supporting Hypothesis 1. This finding clearly points to shared instrumentality as a driver of information exchange in groups, and is important for a few reasons. First, it is important because it shows the motivational premises described in expectancy theory can have significant effects on not only how much effort individuals put into group discussion, but what they do with that effort, in terms of the type of information they share. Specifically, increasing instrumentality through task interdependence increased the sharing of both common and unique information. The latter of which led to improved group decision making. Secondly, this finding set the stage for investigating Hypotheses 2, which deals with the motivation to use expertise.

The data supporting Hypothesis 2 indicated that task interdependence was a necessary condition to increase the solve rate in the current study. This finding replicated previous research describing the positive influence of seeing each group member as important to the group outcome on information seeking and giving (Cleavenger, Gardener & Mhatre, 2007; Katz-Navon & Erez, 2005). It also provides a fuller understanding of the importance of assigning experts within groups to facilitate information exchange. Specifically, assigning experts is

important to both engender the motivation to exchange full information and to create awareness of others expertise. Additionally, the findings indicate that even in the absence of experts, assigning non-overlapping roles to group members in order to create a non-zero sum perception of instrumentality drives group members to seek others expertise relative to the task.

Further, a post test indicated that those groups high in task interdependence who were given random roles were still aware of each other's expertise half of the time, as compared to 70% of the time when groups were told who know what as a group, and 40% of the time when group members were individually told who they were an expert on. This finding provides evidence that task interdependence is enough to promote the creation of expertise awareness, even in the absence of pre-existing information regarding expertise. Finally, part of the reason for this was that those in random roles groups were more willing to disagree with each other and request information from each other than in the other conditions. In light of the expectancy theory hypotheses, one reason for the difference between the random roles and expert group conditions in these two behaviors could have been that expert group members had no need to disagree as they knew who was an expert on which suspect. In addition, requesting information may have been less necessary since members may have readily volunteered information on their expertise.

**Limitations and Directions for Future Research**

As is the case with any study, certain design characteristics were limited in favor of others. First, the hidden profile case is a fabricated scenario where complete information regarding the problem is present. This setup provides an excellent task to study group decision making since all relevant information can be accounted for. Still, it would be interesting to study the influence of instrumentality perceptions with field groups as it is likely all information

regarding a problem will not be available to them. In such scenarios the role of expectancy motivation may be even greater since information must be sought out which is not immediately available. Additionally, the experiments described took place over an hour time period in the lab. These time limitations of the lab precluded the current study from incorporating much information on team development. Yet many processes which occur over time, during interactions, are important to team information exchange and decision making. Finally, a task interdependence intervention was utilized to influence the relative perceived instrumentality of a focal individual and his or her teammates. Nevertheless, this substitution may not be realistic in all cases. All group members entered the experimental task environment and were told whether the task would be outcome interdependent. This setup allowed the task interdependence manipulation to influence perceptions of teammates' instrumentality while allowing focal participants' instrumentality to remain high. However, in some real world groups, task interdependence is not so well defined. Therefore, it may be possible for task interdependence and instrumentality to act independently. For example, mystery solving teammates of Sherlock Holmes, with no information concerning task interdependence, would rate him as being highly instrumental to the group outcome, despite rating the task as low on task interdependence. In such situations it is unlikely the team would share much unique information because they would simply rely on Sherlock to solve the case. Therefore, the results should be taken out of contexts where task interdependence is well defined.

Still, the results found show that task interdependence is important in group decision making, and should be applicable in environments which require the constant searching out of task-relevant information, including those striving for creativity and those involving adaptation. Creativity is generally defined as the recombination of associative elements into new ideas that

are both novel and useful (Amabile, 1988, 1996; Oldham & Cummings, 1996; Scott & Bruce, 1994). In groups, this process involves maximizing member expertise and unique knowledge so ideas can come to the forefront which members with diverse experience may see in different lights and therefore apply to problems in innovative way (Baruah & Paulus, 2009). The results of current study indicate that this process can be enhanced by focusing attention on the motivation to search out such information, specifically by assigning roles to team members. Therefore, it may behoove those attempting to utilize groups to find creative solutions to problems to assign such roles, or, at least, assure every group member feels instrumental in the group's performance.

Further, the consistently changing business environment has made workplace learning and continuous improvement a modern necessity (Salas & Cannon-Bowers, 2001). This means that a group having the meta-knowledge to know how to adjust to new tasks and environments is of great competitive advantage. A main component of adjusting to changing task environments involves the seeking out of applicable information concerning those environments (Bell & Kozlowski, 2010). The results of the current study indicate that this process will be augmented by focusing on the instrumentality perceptions of group members, and making sure each member feels responsible for the group outcome, so they are motivated to search out such task relevant information. Groups improperly motivated may, instead of searching out task-specific information; use similar problem solving strategies to complete dissimilar tasks, resulting is suboptimal decisions.

Finally, evidence exists that individual's personal motives influence their information exchange in group environments and thus group decisions (De Dreu, Nijstad & Knippenberg, 2008; Hollingshead, Jacobsohn & Beck, 2009; Steinel, Utz & Koing, 2010). For example, group members competitively striving towards personal rewards share low amounts of unique

information, resulting in poor decision quality (Toma & Butera, 2009). Likewise, the desire to obtain status or to gain credit for group performance can influence information exchange (De Dreu, Nijstad & Knippenberg, 2008). The current study provides evidence that assigning roles, and thus increasing the task interdependence of group members, may help to attenuate such strategic information sharing since increasing task interdependence creates a situation in which members personal goals are dependent on other team members (Karau & Williams, 2001).

It is hoped the current study is seen as a step in integrating the motivation and information exchange literatures. Group decision making is wrought with errors, some of which, as with the friendly fire disaster cited in the introduction, can have dire consequences. Additionally, more common, yet just as inefficient, organizational decisions can lead to lower performance and profit. It is clearly important to create knowledge networks within groups in order to optimize their decision making ability, however it must be recognized that individuals must be driven to utilize these networks and to solve problems in groups, just as they must be individually. Expectancy theory provides one such explanatory mechanism and its investigation, along with other motivational mechanisms present in groups, will help to provide a fuller understanding of group information exchange.

**Conclusion**

Transpersonal efficacy was introduced to augment Social Cognitive Theory by allowing it to account for the single others that comprise many task environments. The studies presented collectively provide evidence that such perceptions drive individual effort allocation and helping behavior, driving group resource allocation. Further, I found preliminary evidence that these perceptions, through their influence on instrumentality, may also influence within-group information exchange.

These findings show that transpersonal efficacy can help to explain why people consistently underutilize their personal effort and expertise when interacting towards task goals (Karau & Williams, 2001; Stasser & Titus, 2003). The expanded use of interpersonal work environments has made understanding the processes that underlie this individual deficiency in the context of others vitally important to comprehending modern organizational life (Devine, et al., 1999; Gully, et al., 2002; Guzzo & Shea, 1992). Moreover, task interdependence was shown to be a specific trigger of group resource allocation optimization due to its influence on the relationship between self and transpersonal efficacy.

In addition to these theoretical and practical implications, it is hoped that these findings will help to influence the meta-perception of groups in the current organizational behavior paradigm. Specifically, these findings support the proposition that, in order to accurately predict group member behavior, groups should not be viewed as single entities or collections of individuals, but as collections of individuals who are each acting within an environment of people (e.g. Kozlowski & Klein, 2000; Wegner, 1987). This is important because it gets to the point that people reciprocally influence each other in terms of the effort they expend towards group tasks, towards helping group members, and towards sharing information. Thus, in order to gain insight into interpersonal processes, it is vital to collect data that capture human interaction.

In summary, it is hoped that the current studies involving transpersonal efficacy are viewed as a step in redefining groups, not as single entities, or collections of single entities, but as collections of entities that reciprocally influence each other's behavior and cognition. Transpersonal efficacy allows this by focusing on the specific perceptions that exist between all sets of group members, thus allowing for focus on the dynamic cognitive interplay that exists in interpersonal settings. Thus, transpersonal efficacy not only helps to explain how to overcome

motivational deficiencies in interpersonal contexts, but also allows the opportunity to explain dynamic group processes involving multiple behavioral outcomes in the future.

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