# Team Size, Dispersion, and Social Loafing in Technology-Supported Teams: A Perspective on the Theory of Moral Disengagement

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ABSTRACT: Social loafing is the tendency of individuals to withhold contributions to a task in a team setting. Team size and dispersion are two primary drivers of social loafing in technology-supported team settings. However, the mechanisms through which

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these drivers affect social loafing are not well understood. Consequently, the objective of this study is to identify the cognitive mechanisms that mediate the effect of team size and dispersion on social loafing in technology-supported teams. Drawing on the theory of moral disengagement, we posit that three primary cognitive mechanisms—diffusion of responsibility, attribution of blame, and dehumanization—will mediate the effect of team size and dispersion on social loafing. We conducted a laboratory study involving 140 students randomly assigned to 32 teams performing a brainstorming task using group systems software. The results show that diffusion of responsibility, attribution of blame, and dehumanization all mediate (partially) the effects of team size on social loafing. Meanwhile, only dehumanization mediates (fully) the effect of dispersion on social loafing.

KEY WORDS AND PHRASES: computer-mediated communication, creativity, electronic brainstorming, idea generation, individuals in teams, social loafing, team performance, team productivity, technology-mediated collaborative environments, technology-supported team efficacy, theory of moral disengagement, virtual collaboration, virtual teams.

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ORGANIZATIONS ARE INCREASINGLY RELYING ON TEAMS to make important decisions. The emergence of teams as an intra- and interorganizational structure is driven in part by two factors. First, teams often have more, and better, informational resources than individuals [26]. Initially, this advantage was viewed as a luxury that organizations could use at their convenience. However, with globalization today, decisions are often so complex and diverse that they require the creativity, knowledge, and experience that only a team could possess. Second, the advent of new information and communication technologies (ICTs) has allowed organizations to assemble their most capable individuals on an as-needed basis regardless of their physical location [12, 76, 84, 85]. An implicit assumption underlying these two factors is that people will contribute as much in team settings as they do when working alone. However, prior research has shown that under certain conditions individuals tend to contribute less in team settings than as individuals (e.g., [19, 34, 97]).

The tendency of individuals to withhold contributions in a team setting is referred to as social loafing [46, 56]. A lack of social control, direct supervision, and increases in team size have been identified as facilitating conditions for social loafing in collocated face-to-face teams [56, 61, 73]. The dispersed settings of many technology-supported teams were expected to reduce social control and direct supervision and increase social loafing in those teams [19, 85, 97]. Chidambaram and Tung [19] provided and empirically tested a specific model of social loafing in technology-supported teams and confirmed that team size and dispersion were indeed the two primary drivers of social loafing. Even though this prior work offers an important theoretical foundation, there remain significant theoretical and practical gaps in the literature. From a theoretical standpoint, there have been limited empirical attempts at understanding the mediating mechanisms through which these two key predictors—size and dispersion—influence

social loafing. From a pragmatic perspective, team size is often driven by decision complexity, and technology-supported teams are, in many cases, dispersed. Thus, managers have little, if any, control over these structural factors. Consequently, we believe that one way to advance this literature is to examine the mediating mechanisms that intervene between the effect of team size and dispersion on social loafing. The identification of key mediating factors is an important stepping-stone to designing interventions to curtail the incidence of social loafing in technology-supported teams.

It is broadly recognized that cognitions play an important part in driving individual behavior [35]. Santanen et al. [87] revealed the importance of team members' cognitions on their performance and productivity. Thus, an examination of the cognitions that potentially underlie social loafing in team settings is a natural starting point for understanding mediating mechanisms. The objective of this study is to identify the cognitive mechanisms that mediate the effect of team size and dispersion on social loafing. To accomplish this, we employ the *theory of moral disengagement.* This theory has been used to explain why individuals knowingly choose to engage in socially inappropriate/delinquent behavior when they understand it is wrong to do so [5, 9]. The theory of moral disengagement, therefore, provides a useful theoretical lens for understanding *why* certain team settings facilitate a specific form of antisocial behavior—social loafing. Drawing on this theory, we posit that three primary cognitive mechanisms—diffusion of responsibility, attribution of blame, and dehumanization—will mediate the effect of team size and dispersion on social loafing.

We report on a laboratory study involving 140 students randomly assigned to 32 teams performing a brainstorming task using group systems software. Roughly half of the teams (17 teams) were assigned to work in a collocated setting and the remaining (15 teams) in a dispersed setting. The results show that diffusion of responsibility, attribution of blame, and dehumanization all mediate (partially) the effects of team size on social loafing. Meanwhile, only dehumanization mediates (fully) the effect of dispersion on social loafing. The results of this study make several important contributions to both the technology-supported team and social loafing literatures. First, this research contributes to the technology-supported team and social loafing literature by identifying a set of cognitive mediating mechanisms through which team size and dispersion influence social loafing. Previous studies have not developed such a cross-level understanding of how team-level structures affect individual team member cognitions and behavior. A second contribution of this work is the extension of the theory of moral disengagement to the domain of technology-supported teams. By contextualizing the theory to this domain, we were able to identify team size and dispersion as key factors that facilitate antisocial behavior in social settings. Finally, the results of this research contribute to the extant literature by demonstrating that team size and team dispersion affect social loafing through slightly different cognitive mechanisms.

## Theoretical Background

A SIGNIFICANT PROPORTION OF THE SOCIAL LOAFING LITERATURE has been examined in the context of traditional (face-to-face) team research. Thus, we first provide an overview

of this extant literature before turning to recent studies on social loafing in technology-supported teams.

## Social Loafing in Traditional Teams

Researchers have been interested in the phenomenon of social loafing for almost a century, starting with Maximilien Ringelmann in 1913 [51]. Social loafing has been consistently shown to occur in team settings, even in different contexts and with various tasks, such as pumping air [51], negotiating simple mazes [42], swimming [107], brainstorming [38], and decision making [77].

Several theories have been proposed to explain social loafing. These include (1) the "social impact" theory, which asserts that the main cause of social loafing is the social forces that arise from team interactions [54]; (2) the "output equity" theory, which asserts that when individuals work in teams, they adjust their level of output to the level they perceive other members are producing [50]; (3) the "matching-to-standard" theory, which proposes the lack of standards for expected performance levels as an explanation for loafing [98]; and (4) the "absence of evaluation apprehension" theory, which states that social loafing occurs when the task is simple and uninteresting, and individual performance is unrecognized due to pooled output [51]. Karau and Williams [46] developed a unified theory that integrated most of the earlier theories in what they called "the collective effort model." Their model suggests that individuals' willingness to exert effort on a team task depends on their expectations of the instrumentality of their efforts in obtaining valuable outcomes. They conducted a meta-analysis of 78 social loafing studies and found social loafing to be moderate in magnitude and generalizable across different tasks and populations. A number of moderators were found to affect the relationship between teamwork and social loafing. These include identifiability and accountability [34], evaluation potential [39], cohesion [47], and identification with the team [48].

## Social Loafing in Technology-Supported Teams

Information systems (IS) researchers have devoted considerable attention to the problem of social loafing and productivity loss in technology-supported teams, especially in the context of electronic brainstorming (e.g., [19, 28, 33, 74, 92, 97, 99, 104, 110]). However, social loafing is not a phenomenon that is confined to brainstorming tasks. Indeed, social loafing has emerged in technology-supported teams performing other types of tasks as well. For example, McAvoy and Butler [66] found that social loafing is a major problem for technology-supported teams working on Agile software development tasks. Further, some researchers have argued, and provided empirical evidence, that social loafing is more pronounced in knowledge teams, because knowledge is implicit and, therefore, easy to conceal [59]. From the above-cited studies, two factors have consistently emerged as major antecedents of social loafing or productivity loss in technology-supported teams—team size and dispersion [19].

## Team Size

Team size has been the main explanation for social loafing in technology-supported teams [97]. For example, Chidambaram and Tung [19] and Valacich et al. [101] provided empirical evidence that as team size increases, productivity per person decreases. Riopelle et al. [83] explained the negative effect of size on technology-supported teams' productivity by arguing that increased size makes the interaction between members more difficult and complex. Chidambaram and Tung [19] argued that when team size increases, members feel that their contribution becomes less crucial to the success of the team and, hence, lose motivation to contribute. This observation has been attributed to a dilution effect [46, 52]. However, we believe that this phenomenon is more complex. The psychological mechanisms through which the effects of team size are felt have not been extensively explored in the extant literature.

## Dispersion

Another factor that has emerged as a predictor of social loafing in technology-supported teams is dispersion. Dispersion refers to the situation where members of a team are located in different physical locations and communicate through electronic means. The effect of dispersion on team inputs, processes, and outcomes has emerged as a topic of interest for IS researchers (see [76] for a review). This interest has spurred a stream of research on how dispersion influences team productivity and performance (e.g., [16, 60, 91]). Research comparing collocated and dispersed teams has produced evidence that collocated teams outperform dispersed teams (e.g., [67]). Dispersion has been shown to increase social loafing (usually measured as per person number of generated ideas). For example, Chidambaram and Tung [19] have compared dispersed and collocated teams in terms of number of ideas generated per person in a brainstorming task. They found that the mean number of ideas generated by members of dispersed teams is significantly less than that of members of collocated teams. To explain these findings, Chidambaram and Tung [19] referred to social impact theory [54], which suggests that the social impact of watching coworkers performing a task is different from the impact of reading their electronic messages. Also, impression management theory suggests that people are mainly concerned about their self-presentation [57]. When people are identifiable, as is the case in collocated teams, they are more likely to display socially desirable behavior. However, when they are anonymous or when their contribution is less identifiable, as in dispersed settings, they lose restraint and it is easier for them to engage in social loafing [75]. Increased dispersion is associated with increased anonymity [100], decreased visibility [19], and difficulty of making social comparisons [92], all of which are linked to increased social loafing (see [44, 92, 106]).

To summarize, team size and dispersion have consistently emerged as the two main variables that affect social loafing in technology-supported team settings [19]. The identification of these antecedents contributed to our understanding of social loafing, but there is a clear need for more work in this area. The current research extends the

work of Chidambaram and Tung [19] by identifying the cognitive mechanisms through which team size and dispersion increase social loafing. We believe the theory of moral disengagement [4] provides us with a useful theoretical lens for understanding the incidence of antisocial behaviors such as social loafing.

## Theory of Moral Disengagement

Bandura developed the theory of moral disengagement to explain why people are able to engage in socially inappropriate conduct [5, 7, 9]. According to Bandura [4], people are guided by personal standards of ethical behavior, and most people tend to refrain from acts that violate their own standards of appropriate conduct. An individual's moral evaluation is translated into actions through the self-regulatory mechanisms of moral agency. The two self-regulatory mechanisms are social sanctions and self-sanctions. Social sanctions are theorized to restrain immoral behavior through the expectation that such behavior will result in "social censure" and other adverse social consequences. Nevertheless, social sanctions are limited because of the fact that most immoral behaviors go undetected. Yet people will still refrain from engaging in transgressions because of self-sanctions or self-condemnation.

The theory of moral disengagement posits that individuals are able to suspend the self-regulatory processes that sociocognitive theory suggests govern their ethical behaviors. Bandura uses the term "mechanisms of moral disengagement" to refer to those cognitive mechanisms that enable "otherwise considerate people to perform self-serving activities that have detrimental social effects" [5, p. 28]. When an individual engages in a behavior that is inconsistent with his or her beliefs or his or her self-esteem, a state of psychological tension is induced, as suggested by the theory of cognitive dissonance (see [23] for a review of the theory of cognitive dissonance). This tension results in an uncomfortable feeling, leading that person to seek to reduce the dissonance between the behavior and the belief. Moral disengagement serves as a tool to reduce such dissonance by employing cognitive mechanisms that align an individual's beliefs with his or her behavior. In short, the theory of moral disengagement explains why people misbehave when they believe no one is looking.

Most of the work on moral disengagement has been theoretical, predominantly in the context of predicting military violence and criminal behaviors (see [8]). Researchers have used this theory to predict aggression and antisocial behavior in children [9], declines in civic behavior [17], violence toward animals [102], computer hacking [86], reactions to wars [3], and organizational corruption [71].

The theory of moral disengagement constitutes a useful theoretical lens for examining social loafing in technology-supported teams, especially those that are dispersed. This is because increased anonymity and decreased social presence in those teams is expected to weaken the role of social standards that would otherwise restrict inappropriate acts. When the role of social standards is weakened, self-standards become more salient. "As long as self-sanctions override the force of external inducements, behavior is kept in line with personal standards" [5, p. 28]. However, in the face of strong external inducements, such conflicts are often resolved by selective disengage-

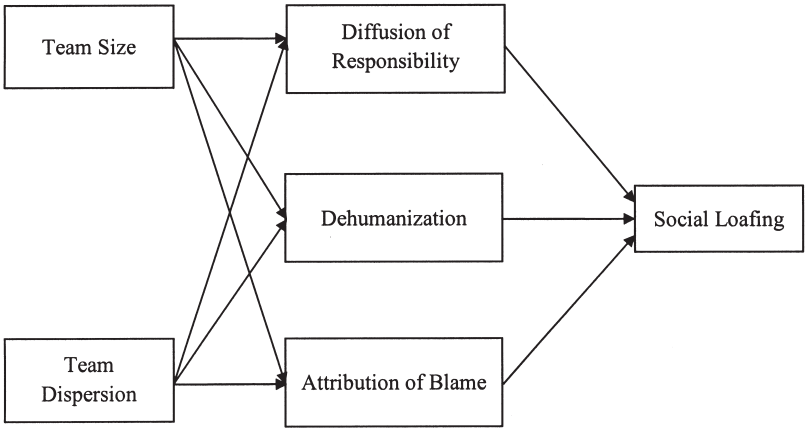


*Figure 1.* Research Model

ment of self-sanctions. The theory of moral disengagement focuses on how individuals override those self-restraints in order to perform antisocial and self-serving behaviors, such as social loafing. Although some might think that these mechanisms are specific to uncommon contexts and situations, Bandura points out that, when making daily decisions, people "routinely" resort to the mechanisms of moral disengagement to "further their own interests or for profit" [5, p. 43].

In the context of social loafing in technology-supported teams, three mechanisms of moral disengagement play an important role. Specifically, we suggest that the mechanisms of diffusion of responsibility, dehumanization, and attribution of blame are important enablers of social loafing in technology-supported team settings. These three mechanisms are particularly relevant given the contextual conditions facilitated by team size and dispersion. We define and discuss each of the three moral disengagement mechanisms and present our arguments for their mediating roles next.

## Research Model and Hypothesis Development

Figure 1 presents the research model. As the figure illustrates, individual cognitions are argued to play a mediating role in linking team size and dispersion to social loafing.

## The Role of Diffusion of Responsibility

*Diffusion of responsibility* is defined as a cognitive process through which accountability for work outputs is transferred to others [55]. Diffusion of responsibility weakens the exercise of self-control by obscuring personal agency for the team outcome. Through this psychological mechanism, individuals feel less personal responsibility, given that there are others available to do the same work, or as Bandura notes, "when everyone is responsible, no one really feels responsible" [9, p. 365]. This psychological mechanism

has been drawn upon to explain why people are unlikely to help someone in distress when other bystanders are present [89]. Our model proposes that this cognitive process will mediate the effect of team size and dispersion on social loafing.

## Team Size

As noted earlier, several explanations for the relationship between team size and loafing have been advanced, including the dilution effect, which suggests that as teams become larger, the visibility of individuals' effort decreases and monitoring of individuals' output becomes more difficult, resulting in a loss of motivation to perform [2, 44]. The current research proposes diffusion of responsibility as an explanation for why members of larger teams loaf more. When team members feel that their share of responsibility is less, and that other people are available to do the task, they become less motivated to put forth the required effort. Literature on helpfulness supports this assertion. For example, Berkowitz [11] conducted an experiment where he asked the participants to work for a supervisor who stands to win a prize, depending on the productivity of those participants, although there is "nothing in it for them." Half of the participants were led to believe that they were the only ones working for the supervisor and the other half believed that there were two other coworkers working for the same supervisor and that the final output would be the average of the work of the three participants. The results of that experiment revealed that participants were least productive when they believed that they shared the responsibility with others. In another experiment, Petty et al. [73] found that effort decreased significantly when team size was increased from 4 to 16. Hence, it is plausible that when other people are available to work on a team task, a team member believes that he or she has relatively less responsibility for achieving the team's objective, and he or she then "passes the buck" to the other members and decreases his or her efforts. As team size increases, more people are involved in accomplishing the team's goal, and, hence, responsibility is diffused among a larger number of stakeholders. Such an increase in diffusion of responsibility would weaken individual responsibility for team goal achievement and, thus, would facilitate social loafing without the fear of activating self-sanctions that would otherwise restrict people from loafing.

> *Hypothesis 1a: Diffusion of responsibility will mediate the relationship between team size and individuals' social loafing.*

## Team Dispersion

As team members become physically isolated from each other, social contextual cues are significantly reduced [18, 24]. This lack of social context contributes to individuals' lack of understanding of their own responsibility with regard to the team's goal. In her study of geographically distributed student teams, Cramton [24] found that in some cases, team members made implicit assumptions about who was responsible for specific tasks. Consequently, several tasks remained uncompleted. Without the benefit of face-to-face collocation, team members are prone to making assumptions about

what their teammates are doing [53], thus implicitly delegating responsibility for task outcomes to them. A lack of physical collocation makes it easier, psychologically, for individuals to reduce personal agency and shift responsibility for task work to unseen others [18]. In addition, increased dispersion reduces individuals' tendencies to engage with the team [18, 41]. When they are less engaged with the team, team members are less willing to contribute to the work, assuming that others in the team will put forth the necessary effort. In sum, dispersion in teams provides social conditions that make it psychologically easier for an individual to shirk responsibility for the team's success because unseen others are available to do so.

*Hypothesis 1b: Diffusion of responsibility will mediate the relationship between team dispersion and individuals' social loafing.*

## The Role of Dehumanization

*Dehumanization* represents "the denial of qualities associated with meaning, interest, and compassion" toward others [10, p. 98]. People who engage in dehumanization do not perceive the human qualities of others [8]. They do not perceive or consider the feelings, hopes, and concerns of others as important or relevant to them. For instance, during wartime, countries usually portray their enemies using nonhuman images to make it easier to kill or torture them. Although some might consider dehumanization as extreme, Bandura [6] points out that many aspects of contemporary life promote impersonalization and dehumanization. People become more inclined to relate to each other in impersonal ways as levels of bureaucratization, automation, and urbanization increase. Dehumanization is salient to the domain of technology [40].

Because the strength of self-sanctions depends in part on how the recipients are viewed, the dehumanization disengagement mechanism operates through ignoring some human qualities of others such as feelings and emotions. Perceiving another individual as a human with feelings that need to be considered and emotions that need to be recognized increases one's perceived similarity with them and, therefore, makes it difficult to target them with antisocial behavior [9]. According to Schwartz and Struch [90], when an individual does not perceive another individual as having similar values, his or her perception of shared humanity decreases and the interests of the other individual can be easily disregarded. Moreover, people who dehumanize others feel that they are free to use them instrumentally for their own self-interests [40].

### Team Size

Theory would suggest that dehumanization would mediate the effect of team size on social loafing in technology-supported teams. An important element of dehumanization is the refusal to ascribe an identity to a person [40]. Kelman [49] notes that to dehumanize a person is to deny that he or she is an entity that is distinguishable from others. Increasing team size is expected to positively influence dehumanization. As teams increase in size, it becomes more difficult for people to make individual interpersonal connections. Such a lack of personal connection de-individualizes teammates to

one another, divesting them of human characteristics such as feelings and compassion [40]. Haslam argues that collectives of people can be dehumanized as "members of a 'generalized other'" [40, p. 259]. When individuals psychologically dehumanize their teammates, they are less likely to feel remorse for social loafing. Instead, they tend to view their teammates as being automatons—robotic, emotionless entities that simply exist to get work done [70]. Through such a mechanistic orientation toward their teammates, individuals may feel less of a need to pull their weight in achieving team goals, given that other entities exist to do the work [58]. Viewed through this lens, social loafing becomes less of an antisocial behavior.

*Hypothesis 2a: Dehumanization will mediate the relationship between team size and individuals' social loafing.*

### Team Dispersion

Dehumanization is also expected to mediate the relationship between dispersion and social loafing in technology-supported teams. Researchers have noted that technology can be a dehumanizing tool. For example, one main reason for the reservations about using computers in education was educators' concern that computers would reduce social relatedness while increasing dehumanization [72]. Also, communication technology reduces people's perceptions of social presence, defined as the extent to which one feels the presence of a person with whom one is interacting [16]. Communication technology restricts socioemotional communication [82] and thereby reduces the awareness of others and their emotions and feelings [95]. Dispersed teams that use communication technology to interact suffer from low psychological proximity. Physical proximity, as in face-to-face settings, promotes psychological closeness and mutuality, described as "a sense of connection, similarity, solidarity, openness, and understanding" [14, p. 7].

In contrast, physical dispersion creates detachment and promotes perceived dissimilarity [15]. Perceived dissimilarity with others is the core of the mechanism of dehumanization. Team members tend to marginalize or reduce communication with other members who are perceived to be dissimilar [78]. Also, Milgram [68] notes that most people persistently refuse to behave punitively when the situation is personalized, such as when they see the recipient of the behavior [9]. Therefore, when a team member does not see his or her teammates—as in the case of many technology-supported teams—then it is easier for him or her to target them with antisocial behaviors, such as social loafing.

*Hypothesis 2b: Dehumanization will mediate the relationship between team dispersion and individuals' social loafing.*

## The Role of Attribution of Blame

*Attribution of blame* refers to the cognitive process of blaming the recipients of the antisocial behavior for bringing suffering upon themselves [4]. Blaming the recipient

of the act allows the actor to view himself or herself as a victim who was provoked, hence his or her actions now can be viewed as being defensive [9]. When a team member blames other members for his or her own social loafing, the individual frees himself or herself from being guilty for not working hard. The team member believes that other members should bear the responsibility for his or her own loafing. This belief serves self-exonerative purposes and thus increases the propensity for loafing without the fear of activating self-sanctions or threatening self-esteem.

### Team Size

Team size can negatively affect team process variables [93]. Team cohesion is reduced as team size increases [105]. Team size also reduces team trust and the potential for cooperation within teams [88]. Individual team members have less opportunity to participate in discussions in larger teams than in smaller teams [37]. A lack of participation can adversely affect team member's satisfaction [27]. As a result, team size has been found to reduce communication frequency within teams [109]. Although increases in team size can have informational benefits, these benefits can be offset by the coordination, communication, and social integration problems associated with increases in team size [93].

Individuals tend to make self-serving attributions [13]. They usually attribute causes of positive behaviors or successes to themselves, while they attribute their negative behaviors or failures to others [103]. Team size affects the way people make self-serving attributions [108]. As team size increases, so does the tendency for individuals to blame others for their own faults [108]. This means that as team size increases so do the number of internal team problems and the propensity of individuals to blame their teammates rather than themselves for those problems.

As team size increases, so does the likelihood that an individual will find someone to blame for his or her own loafing. Larger teams provide more targets for individuals to blame than smaller teams. Smaller teams have fewer targets of blame, which forces individuals to take more responsibility for their own behavior. The more individuals blame other team members rather than themselves, the more they will feel justified to engage in social loafing. Hence, we propose the following hypothesis:

> *Hypothesis 3a: Attribution of blame will mediate the relationship between team size and individuals' social loafing.*

### Team Dispersion

Theory would suggest that dispersion can positively affect attribution of blame by altering team members' role perception. Role perception determines the likelihood that individuals will attribute events or behaviors to be driven by internal rather than external causes [25]. When team members work together collocated, they view events through the eyes of an actor immersed in the context and situation. Actors are more likely to take personal responsibility and not ascribe their (or the team's) shortcomings

to others [25, 43]. However, when individuals are dispersed, they view events through the ideas of an observer. Observers will be more likely to attribute blame internally to other team members [43]. Observers tend to blame their personal failings (and the team's) on their teammates and will judge their teammates' behavior more harshly [25, 43].

Prior research has confirmed that dispersion can affect how team members judge each other [15]. In a study by Burgoon et al. [15] in which the task involved using a chat system to solve a decision-making problem, participants who worked in face-to-face settings judged their partners as more competent, reliable, trustful, and dependable than those who worked in dispersed settings. In another study, members of dispersed teams blamed their partners for poor performance or negative behavior more frequently than did members of collocated teams [103]. Cramton [24] also found that individuals in virtual teams made negative attributions about team members who were located in a different geographic location from themselves.

When an individual blames other members for his or her own loafing, "not only are one's injurious actions excusable but one can even feel self-righteous in the process" [9, p. 366]. Team members in dispersed settings will be more inclined to blame other team members' behavior as justification for their social loafing. We hypothesize the following:

> *Hypothesis 3b: Attribution of blame will mediate the relationship between team dispersion and individuals' social loafing.*

## Method

We conducted a laboratory experiment to test the hypothesized relationships. One hundred and forty undergraduate business students from a medium-size university in the southern United States participated in the study. Thirty-nine percent of the participants were female. The average age of participants was 21 with a standard deviation (SD) of 2.84. A total of 32 teams were formed using random assignment. Team size and team dispersion were manipulated in the experiment. Team size ranged from three to ten members, with about 40 percent of members assigned to teams of size six and larger. This is consistent with prior studies that recommend a doubling of team size to observe size effects (e.g., [19, 99, 101]). To operationalize dispersion, 17 teams were randomly assigned to a collocated setting while members of the other 15 teams were physically dispersed across different rooms. Each subject was offered $10 for participating in the study. Also, members of the best-performing teams were offered $20 cash each.

### Task

We used a brainstorming task that has been validated in prior team research and used with undergraduate students (e.g., [18, 19, 69]). We chose a brainstorming task because idea generation is a key step in organizational problem solving [80]. The task

required team members to consider themselves as part of the board of directors of a U.S.-based wine-producing company that was facing a serious image issue in Europe. The board of directors was tasked with making a recommendation to the company's management. Team members were asked to generate as many ideas as they could to help the company improve its image. Given that our sample is composed of business students, the task is relevant to their studies and future professional objectives. To ensure that the task was meaningful to participants, we measured task meaningfulness and reward meaningfulness [94] in the postsurvey and found high values for both variables, with an average of 4.9 (SD = 1.2) for task meaningfulness and an average of 5.3 (SD = 1.37) for reward meaningfulness on a seven-point Likert scale. These high mean values indicate that participants viewed the task and associated reward as being important and meaningful.

## Experimental Setting

Members of the collocated team condition met in a conference room. They were seated around a square-shaped table, facing each other. In front of each member was a computer—with group support system software—that was to be used to input ideas during the task. In addition, there was a drop-down screen (visible to all team members) in front of the room, which showed generated ideas. Participants in this condition were instructed to individually generate ideas. The ideas generated by each team member were displayed on the main drop-down screen in real time.

In contrast, members of teams in the dispersed condition were physically located in separate rooms and did not have the opportunity to meet face-to-face. Each member was assigned to a small room that had a networked computer, the task description, and procedure guidelines. The only difference between teams in the collocated condition and teams in the dispersed condition was the location of the members. Other than that, we followed the same procedure for teams in both conditions.

## Technology

All teams involved in the experiment used a group support system called *GroupSystems® ThinkTank®* to conduct their work on the task. It is an online collaborative tool that offers teams a structured collaboration environment using a standard Web browser. The software is composed of several group support tools. The entire brainstorming task was completed using the online group support system. Anonymity of the team members was ensured by using an identification code to identify members during the task instead of using their real names.

## Training

All teams received identical training on the use of GroupSystems® ThinkTank®. The trainer used an idea generation task (generating ideas for different uses of a knife) and

walked the participants through the system. The training lasted for about 30 minutes and participants had the opportunity to ask questions about how to use the software. In addition, a cheat sheet was provided to all participants detailing how to use the system to accomplish the required task. Participants were not aware of the specific research questions of the study, and they were asked not to discuss the study or the training with others.

## Procedure

Participants were first welcomed and guided to a lab where they received training on the group support system. Then members of the collocated teams were escorted to the conference room while members of the dispersed teams were escorted individually to their one-member-only rooms. Participants in the dispersed condition were unaware of the identity of their teammates. Before they could start working on the task, all participants had to complete an online survey that captured their demographic information. They were then given 15 minutes to read the task description. At the end of the 15 minutes, one of the researchers activated the "Brain Storming" tool and all participants were instructed to begin generating as many ideas as they could. Members were able to read all of the ideas generated by their teammates. However, they could not discuss or comment on those ideas. All teams in the experiment had 20 minutes to complete the brainstorming task. Participants were then directed to the online postexperiment survey, which captured their perceptions about different variables related to the research questions. Finally, participants were debriefed, thanked for their participation, and dismissed. A summary of the procedure is outlined in Table 1.

## Measures

### Social Loafing

In order to evaluate individual contributions to the team task, we calculated the total number of ideas generated by each individual during the brainstorming phase. Using this approach, a lower number of ideas is indicative of a higher level of social loafing [19]. Every idea was tagged with an identification code that represents the contributor and was used to link the number of ideas with the contributor's responses to the survey. In the case of redundant ideas, we only counted the first idea contributed and eliminated the rest. This operationalization of social loafing is consistent with previous research (e.g., [22, 101]) and with the objectives of the study.

### Diffusion of Responsibility, Dehumanization, and Attribution of Blame

Because existing scales did not exist to measure the cognitive mechanisms in our study context, it was necessary to develop new scales. Thus, new scales were developed to measure individuals' diffusion of responsibility, dehumanization, and attribution of blame following guidelines outlined by DeVellis [29]. First, we developed a list of

Table 1. Experiment Timeline

| | | Phase | |
|---|---|---|---|
| | Duration | Collocated team | Dispersed team |
| Training | 30 minutes | Training on ThinkTank® | Training on ThinkTank® |
| Pretask questionnaire | 5 minutes | Online survey | Online survey |
| Reading task description | 10 minutes | Hard copy | Hard copy |
| Idea generation task | 20 minutes | Using electronic brainstorming tool | Using electronic brainstorming tool |
| Posttask questionnaire | 15 minutes | Online survey | Online survey |

initial items based on the definitions of the constructs and prior research (e.g., [9]). Second, we reviewed the list with several researchers in the domains of behavioral IS research and technology-supported teams to ensure content and face validity of the items [96]. Third, we conducted a card-sorting exercise with ten Ph.D. students. Each item comprising the three scales was placed on a separate index card. The exercise required participants to organize the single pile of index cards into separate piles that they felt were related. Through discussion and feedback from the participants, several items were excluded from further consideration. Finally, we conducted a pilot study involving 47 participants to statistically assess the reliability and construct validity of these items. The scales exhibited adequate psychometric properties. The final set of items is listed in Table 2.

### Team Size and Dispersion

Consistent with prior research (e.g., [36]), we measured team size as a continuous variable. As noted earlier, team sizes in our sample ranged from three to ten members. Given the random assignment of teams to the dispersed versus collocated condition, we operationalized dispersion as a dichotomous variable, with a value of 0 indicating a team in the collocated condition and a value of 1 indicating a team in the dispersed condition.

## Results

We used partial least squares (PLS), a structural equation modeling (SEM) technique, to test the research model. In particular, the software used was SmartPLS version 2.0.M3. Because PLS uses a component-based approach, it places minimal

Table 2. Items for the Mechanisms of Moral Disengagement

| Construct | Items |
|---|---|
| Dehumanization | |
| DHM1 | During the task, I did *not* really feel that I was interacting with people. |
| DHM2 | The human aspect of other team members was *not* obvious during the task. |
| DHM3 | I felt that I was interacting with a computer rather than a human being. |
| DHM4 | I did *not* have a feeling of the human aspect of the interaction. |
| Diffusion of responsibility | |
| DFR1 | It is unfair to blame an individual group member who had only a small part in the group task if the task was *not* performed well. |
| DFR2 | I had limited responsibility for achieving the team's objective. |
| DFR3* | I had large responsibility for achieving the team's objective. |
| DFR4* | My share of responsibility for achieving the team's objective was . . . |
| Attribution of blame | |
| ATB2 | If some group members were *not* performing well, it would be their fault if other members started to withhold their effort. |
| ATB4 | A group member was *not* at fault for not doing his or her best when other group members were not exerting enough effort. |
| ATB6 | If my team did not perform well on the assigned task, other team members should be blamed. |

*Notes:* All items are measured using a seven-point scale anchored by "strongly disagree" to "strongly agree." * Reverse-coded item.

requirements on sample size and residual distributions [63]. To identify the minimum sample size required, we followed Chin's [20] recommendation by multiplying the number of paths leading to the endogenous construct with the most paths leading into it by 10. The outcome variable, number of ideas generated, has five paths leading into it, suggesting that a minimum sample size of 50 would be sufficient. Given our sample size of 140 participants, we are confident that our use of PLS to test our hypotheses was appropriate. The three moral disengagement constructs are modeled with reflective indicators.

## Measurement Model Results

PLS analysis involves two steps: (1) analysis of the measurement model and (2) analysis of the explanatory and predictive power of the structural model. We assessed

Table 3. PLS Factor Loadings

| | Attribution of blame | Diffusion of responsibility | Dehumanization |
|---|---|---|---|
| ATB1 | **0.619** | 0.092 | 0.064 |
| ATB2 | **0.718** | 0.155 | 0.246 |
| ATB3 | **0.908** | 0.345 | 0.212 |
| DFR1 | 0.298 | **0.785** | 0.141 |
| DFR2 | 0.262 | **0.820** | 0.192 |
| DFR3 | 0.122 | **0.727** | 0.257 |
| DFR4 | 0.189 | **0.611** | 0.069 |
| DHM1 | 0.292 | 0.251 | **0.906** |
| DHM2 | 0.208 | 0.228 | **0.889** |
| DHM3 | 0.082 | 0.033 | **0.604** |
| DHM4 | 0.159 | 0.156 | **0.878** |

*Note:* Figures in boldface represent the loadings of individual items on their corresponding factors.

the psychometric properties of the scales by examining item loadings, discriminant validity, and reliabilities. Item loadings and reliabilities above 0.70 are considered acceptable [32]. Table 3 shows PLS item loadings and cross-loadings. The loadings of items for each construct can be interpreted as loadings in a principal component factor analysis [21]. As Table 3 illustrates, the items have loadings above or very close to 0.70. Descriptive statistics for the model constructs, composite reliability scores, and interconstruct correlations are all shown in Table 4. All constructs have acceptable internal consistency because all reliability scores are above 0.70. Specifically, the composite reliability scores range from 0.79 for attribution of blame (ATB) to 0.89 for dehumanization (DHM).

Discriminant validity was assessed by ensuring that two conditions are met: (1) items should load more strongly on their corresponding construct than on other constructs in the model, and (2) the square root of the average variance extracted (AVE) should be larger than the interconstruct correlations [20]. As shown in Table 3, all items load more highly on their corresponding construct than on other constructs (i.e., loadings are higher than cross-loadings). In fact, none of the cross-loadings is greater than 0.35. Furthermore, as shown in Table 4, all constructs share more variance with their items (AVE) than with other constructs. Therefore, we conclude that our model has adequate psychometric properties and it is safe to continue with analysis of the explanatory and predictive power of the structural model.

## Structural Model Results

We ran the structural model in SmartPLS to obtain path coefficients and corresponding *t*-values. *t*-values were obtained using the bootstrapping method with 1,000 iterations. PLS path coefficients are interpreted as standardized beta weights in a regression analysis. The path coefficients, *t*-values, and variance explained for the model are shown in Figure 2.

Table 4. Reliability and Interconstruct Correlations

| | Composite reliability | Mean | Standard deviation | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Attribution of blame | 0.79 | 3.53 | 1.22 | **0.75** | | | | | |
| 2. Diffusion of responsibility | 0.82 | 3.66 | 1.09 | 0.30** | **0.73** | | | | |
| 3. Dehumanization | 0.89 | 3.27 | 1.30 | 0.25* | 0.22* | **0.82** | | | |
| 4. Dispersion | N/A | 0 | 0 | –0.02 | –0.04 | 0.57** | **1** | | |
| 5. Quantity of ideas | N/A | 7.79 | 4.21 | –0.43** | –0.44** | –0.39** | –0.05 | **1** | |
| 6. Team size | N/A | 5.21 | 2.13 | 0.27** | 0.56** | 0.12 | –0.10 | –0.38** | **1** |

*Notes:* $N = 140$. Boldface values are the square root of the average variance extracted. It shows the variance shared between a construct and its measures. Boldface diagonal elements should be larger than off-diagonal elements in order to satisfy discriminant validity requirement. N/A = not applicable. * $p < 0.05$; ** $p < 0.01$.

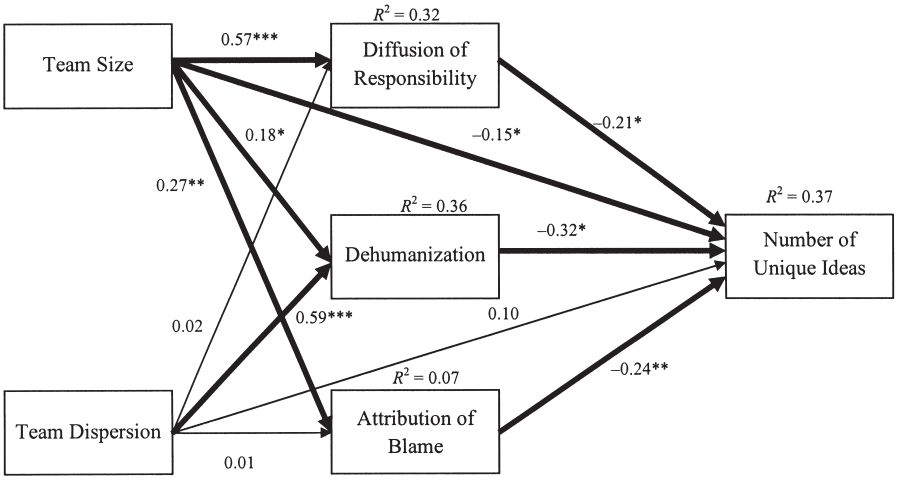


*Figure 2.* PLS Path Coefficients
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Hypotheses 1a and 1b predicted that diffusion of responsibility would mediate the effects of team size and team dispersion on social loafing. As the results in Figure 2 indicate, diffusion of responsibility had a negative relationship with the number of unique ideas contributed by individuals in teams (path = –0.21, $t = 2.14$, $p < 0.05$). Team size was positively related to diffusion of responsibility (path = 0.566, $t = 7.94$, $p < 0.001$), which provides support for Hypothesis 1a. Team dispersion was not significantly related to diffusion of responsibility (path = 0.16, $t = 2.14$, $p > 0.05$). Thus, Hypothesis 1b was not supported.

Hypotheses 2a and 2b posited that the effects of team size and team dispersion on social loafing would be mediated by dehumanization. The results in Figure 2 indicate that dehumanization was negatively related to number of ideas generated (path = –0.32, $t = 2.28$, $p < 0.05$). Team size positively influenced dehumanization (path = 0.18, $t = 1.97$, $p < 0.05$) and team dispersion was significantly positively related to dehumanization (path = 0.59, $t = 8.27$, $p < 0.001$). Thus, Hypotheses 2a and 2b were supported.

Finally, Hypotheses 3a and 3b predicted that attribution of blame would mediate the effects of team size and team dispersion on social loafing. Attribution of blame was negatively related to the number of unique ideas (path = –0.24, $t = 2.76$, $p < 0.01$). Team size had a significant positive relationship with attribution of blame (path = 0.27, $t = 2.82$, $p < 0.01$), therefore Hypothesis 3a was supported. In contrast, team dispersion was not significantly related to attribution of blame (path = 0.01, $t = 0.07$, $p > 0.05$), therefore Hypothesis 3b was not supported. Results of the hypothesis tests are summarized in Table 5. The structural model explained 37 percent, 32 percent, 35 percent, and 7 percent of the variance in the number of ideas generated, diffusion of responsibility, dehumanization, and attribution of blame, respectively.

Table 5. Summary of Findings

| Hypothesis | | Findings |
|---|---|---|
| H1a: | Individual's perception of diffusion of responsibility will mediate the relationship between team size and individual's social loafing. | Supported |
| H1b: | Individual's perception of diffusion of responsibility will mediate the relationship between dispersion and individual's social loafing. | Not supported |
| H2a: | Individual's perception of human qualities of other members will mediate the relationship between team size and individual's social loafing. | Supported |
| H2b: | Individual's perception of human qualities of other members will mediate the relationship between team dispersion and individual's social loafing. | Supported |
| H3a | Attribution of blame will mediate the relationship between team size and individual's social loafing. | Supported |
| H3b | Attribution of blame will mediate the relationship between team dispersion and individual's social loafing. | Not supported |

## Discussion

Recently, team and IS researchers identified social loafing as a major explanation for productivity loss in technology-supported team settings and called for further investigation of this problem (e.g., [19, 31, 79, 97]). In response to these calls, the current study sought to understand why social loafing occurs in technology-supported team settings. Given that team size and dispersion have been identified as major antecedents of loafing in technology-supported teams [19], our objective was to identify the cognitive mechanisms that mediate the effect of these two variables on social loafing within technology-supported teams. We accomplished this by employing the theory of moral disengagement [5] as a theoretical lens, identifying three mediating variables—diffusion of responsibility, dehumanization, and attribution of blame. The proposed model explained about 37 percent of the variance in social loafing, operationalized as number of unique ideas contributed by an individual.

We found that the three mechanisms of moral disengagement played an important role in explaining social loafing. First, we found that diffusion of responsibility partially mediated the effect of team size on social loafing. Individuals in larger teams had higher perceptions of diffusion of responsibility and therefore produced fewer ideas than those in smaller teams. Individuals in larger teams felt that they were less responsible for achieving the team's goal and, hence, reduced their efforts. In contrast, members of smaller teams contributed more as their perceptions of their own responsibility were higher. Second, we found that dehumanization was a significant antecedent of social loafing. Individuals who did not perceive the interactions to be personalized and humanized generated fewer ideas than those with low levels of dehumanization

perceptions. As teams become larger or dispersed, perceptions of the human qualities of members become less obvious and team members, therefore, contribute less. Third, we found support for attribution of blame as an antecedent of social loafing. We found that individuals in larger teams tended to blame other members for their own loafing. According to the theory of moral disengagement, blaming others for one's inappropriate behavior makes that behavior legitimate. In this context, individuals who blamed other members for their own loafing contributed fewer ideas than those who did not attribute the blame to others.

As with all research, the current study has some limitations. First, we conducted our study in a controlled lab environment where teams were focused on a particular task (i.e., brainstorming). Future research is needed to understand the extent to which the relationships we observed would generalize to other types of team tasks. Second, the sample in this study consists of undergraduate students. However, numerous researchers have suggested that the use of student subjects is appropriate and, in some cases, is not much different from the use of practicing managers (e.g., [30, 62, 81]). Third, the dispersed teams in our study were physically distributed within the same building. Dispersed teams in the field can also span different time zones. Such temporal dispersion would probably exacerbate the effects of the mediating mechanisms we examined in this research. Finally, our operationalization of dispersed teams was limited to teams that only communicated through a chat-based system. While this is consistent with earlier research in this field (e.g., [19]), technology-supported teams nowadays have a whole set of different communication media readily available [64]. It is possible that the various functionalities provided by these communication media may yield different effects on the mediating mechanisms we examined here and, ultimately, on social loafing. We encourage future researchers to build on our model to explore possible effects of different communication media on social loafing. Future research should also examine the implications of team size and dispersion for individual motivation, especially when group versus individual reward contingencies are considered [65].

## Theoretical Contributions and Implications

The current study makes several theoretical contributions that hold important implications for teams' research in general and technology-supported team research in particular. First, this study is one of the first to identify the cognitive mechanisms through which team structure variables—that is, size and dispersion—affect social loafing. Although evidence exists that larger team sizes and greater dispersion increase team members' propensity to loaf, such team structure variables cannot have an influence on people's behaviors unless they first affect their beliefs, as suggested by the theory of planned behavior [1]. Using the theory of moral disengagement, this research uncovered those beliefs and tested them empirically.

We also contribute to social loafing research by operationalizing the three mediators—that is, diffusion of responsibility, dehumanization, and attribution of blame. Although some researchers have speculated about the role of diffusion of responsibility

as a possible explanation for the effect of team size on social loafing, to the best of our knowledge, this construct has not been operationalized and tested in the context of social loafing in technology-supported teams. By revealing the mechanisms through which previously identified antecedents affect social loafing, researchers can move forward to design interventions that target those mechanisms.

Another important implication for loafing in technology-supported team research arises from our view of social loafing in this research. By viewing loafing as an antisocial and immoral behavior, we are opening the doors for researchers to extend theories developed originally for analyzing immoral conduct and use them as theoretical lenses for examining loafing behavior. For example, Jones's [45] issue-contingent model of ethical decision making can be useful in understanding why people loaf. Jones [45] discussed how proximity to the recipient of antisocial behavior affects people's intention to engage in it. Proximity seems relevant to the context of social loafing in technology-supported teams. When people have a sense of nearness (physical, psychological, or cultural) to the recipient of their behavior, the moral intensity of that behavior increases and people become more inclined to behave morally. This is just one example of how theories developed initially to investigate ethical and moral problems can be relevant to social loafing research. Future researchers, building on the moral view of social loafing, have a great opportunity to advance research in this area.

We also contribute to the social psychology literature by extending the theory of moral disengagement to a new context. This theory has been primarily used to explain strong aggression and deviant behaviors such as violence [102], corruption [71], and war crimes [7]. However, we show that this theory is also useful in explaining less deviant everyday behaviors such as social loafing. Also, we extend this theory to the context of technology-supported teams. We show how the mechanisms of moral disengagement are affected by variables specific to technology-supported settings (i.e., dispersion) and provide both theoretical and empirical evidence for the new linkages.

## Practical Implications

Lessons learned from this study are useful for practitioners and organizations, given that many organizations utilize teams that communicate primarily through ICTs. First, our study indicates that social loafing is indeed a problem for technology-supported teams. Managers concerned about productivity loss in team settings should take steps, in light of our findings, to reduce social loafing, a major source of productivity loss. For example, our findings confirmed that the size of a team matters, and that adding more members to teams increases the likelihood that members will contribute less toward team goals. However, this effect takes place through its influence on members' perceptions of diffusion of responsibility, dehumanization, and attribution of blame. Managers of technology-supported teams need to make changes to decrease these perceptions. For example, they might want to emphasize the responsibility of each member toward accomplishing the task. By ensuring that each member understands that he or she bears total responsibility for the task and its success, managers reduce perceptions of diffusion of responsibility, which, as this study demonstrates, is a strong predictor of loafing.

Also, organizations need to weigh the costs of collocating teams against the costs of losses in productivity due to team dispersion. Our results indicate that members of dispersed teams are less likely to perceive the human nature of their peers. During the experiment, they felt as though they were interacting with computers rather than with the people on the other side of the network. When dispersion is unavoidable, managers should ensure that team members are aware of the human qualities (e.g., feelings, emotions) of their peers. Better awareness and recognition of feelings and emotions of other members can lead to less loafing and more productivity on the part of members. We speculate that the use of richer media, such as videoconferencing, might be useful in reducing dehumanization perceptions, as richer media are associated with higher perceptions of social presence of other team members [16].

In addition, managers of technology-supported teams need to understand that members of those teams become more inclined to make negative attributions as team size increases. Members of larger teams attribute the cause of their own loafing to other members more frequently than members of smaller teams. This tendency to blame others results in higher propensity to loaf in larger teams. Although, in many cases, managers might not be able to control the size of the team due to task requirements and expertise distribution, they might want to make sure that individuals in teams are attentive to their own loafing and mindful that they cannot attribute their shortcomings to others. For example, to minimize the problem of social loafing, managers would do well to implement a formal evaluation system aimed at identifying each team member's contribution to success or failure of the team's task. Without such a system, each individual would likely construct his or her own version of who contributed to success or failure, with more inclination to attribute success to himself or herself and failure to others [103].

## Conclusion

We believe that our study offers two valuable conclusions. First, social loafing, as a problem that hinders team productivity, is more prominent in technology-supported settings than face-to-face settings. The characteristics of a technology-supported environment make social loafing an easier behavior to engage in. Second, team structure variables that induce social loafing do so through their influence on cognitive disengagement mechanisms. We believe that recognizing those mechanisms is a critical step toward combating social loafing in technology-supported teams.

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