WHO'S THERE? BOUNDARIES, ENTITATIVITY, AND COPRESENCE IN AN ONLINE DISCUSSION FORUM

by

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ABSTRACT

BRITTANY ERNST. Who's there? Boundaries, entitativity, and copresence in an online discussion forum. (Under the direction of DR. ANITA BLANCHARD.)

In this study, social presence theory is proposed as an explanation for the relationship between permeability of boundaries and entitativity in online groups. This claim is tested in an experiment in which group boundaries are manipulated in a fictitious online discussion forum. Structural equation modeling and multiple group analysis were used to test the proposed model and determine whether results were different across the two experimental groups. Results indicate that although participants' perceptions of boundaries were not different across the groups, boundaries predicts both social presence and entitativity. Further, boundaries may be better conceptualized as two separate constructs (weak and strong), and these constructs have differing, and unexpected relationships with entitativity and copresence. However, when additional established antecedents of entitativity are included in the model, boundaries no longer significantly predict entitativity. Implications of studying boundaries and copresence in online and takeaways for practitioners are discussed.

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CHAPTER 1: INTRODUCTION

Online groups are ubiquitous. As with face-to-face (FtF) groups, an online group is defined as at least three people who share a social identity and in-group attributes (Ashforth & Mael, 1989). In 2016, Facebook reached a landmark as 1 billion people used its "Groups" feature to join in online discussions with others on the site (Guynn, 2016). Further, there are over 4 billion internet users in the world, including over 2.3 billion active Facebook users and over 600 million active Google+ members ("Internet Live Stats," 2018).

The internet has changed the way we interact in groups. Seventy-five percent of Americans reported that the internet has helped them communicate with other members in social, professional, and religious groups (Rainie, Purcell, & Smith, 2011). Yet, we still have much to learn about what makes online groups successful. One fruitful research avenue is to understand how online groups are experienced as "groups." One feature, group boundary permeability, can affect how groups are perceived, and thus can help us understand how people experience groups online.

When a group interacts in a physical setting, it is relatively easy to observe boundaries, or the barriers to entering and exiting the group (Lickel et al., 2000). For instance, a fence around a home or the walls of a conference room within a workplace represent clear boundaries. Visual cues can tell a lot about the boundaries of a group of people. For example, if everyone in a group is sitting on the same side of a football field wearing the same color shirt, it is a good indication that they are members of the same

group, in this case, home team football fans. A fan who crosses from one side of the field to the other (i.e. crosses the group's boundary) would be immediately noticeable.

Online, people can cross group boundaries without being noticed. Boundaries can be difficult to evaluate online due to their "fuzziness" (Preece & Maloney-Krichmar, 2005). In online groups, people remain in their own respective physical environments (at their computers), but they can cross virtual boundaries by logging into a website, for example. Sometimes, it is unclear whether this makes a person "part" of the group. A person who logs on to view a group's webpage is not as readily noticed as a person who walks into the opposing team's fan section.

Without clear group boundaries, it is difficult to define a group (Guzzo & Dickson, 1996); without defining who is part of the group, it is difficult for online groups to be successful. This study addresses how group boundaries affect perceptions of groups (such as entitativity) that are critical to group success. Group success can be operationalized as active membership, participation, and group members' perceptions of the group's ability to perform essential functions (Ren et al., 2012; Riggs & Knight, 1994; Shen & Khalifa, 2008). Using previous research on boundaries, entitativity, and social presence theory (Biocca & Harms, 2002; Blanchard, Caudill, & Walker, 2018), I focus on social processes and technical features of an online group discussion forum to understand how online groups are perceived. This research has practical implications for the creation and maintenance of online groups. Theoretically, it tests explanatory mechanism for the causes of entitativity, a predictor of online group success. In the following sections, I discuss group boundaries, followed by the significance of

entitativity, and then the role of social presence theory as a potential explanation for the relationship between boundaries and entitativity.

Permeability of Group Boundaries

Importance of understanding boundaries. FtF boundaries are easier to interpret than online boundaries. At a football game, one can determine who is part of a group by looking at who is sitting in the bleachers and recognizing that fans are seated together in the same section wearing matching colors. Members can then approach the group and join in the group's activities. It is obvious when an outsider crosses the group's boundary, because their physical presence is noticed immediately. Much of the research on boundaries has been done in FtF groups, but a current area of interest is in online groups.

Compared to face-to-face groups, online group boundaries are more fluid and may not be obvious (Guzzo & Dickson, 1996). This makes it challenging, but nevertheless critical to study them because of the prevalence of online groups and the unique purpose they serve. The most common motivations people report for joining online groups are to exchange social support and access to information (Ridings & Gefen, 2004). It is essential to understand online group boundaries because boundaries help distinguish between members of the in-group and the out-group (Guzzo & Dickson, 1996). This distinction is important for determining who is available to provide social support or key information. In addition, without this defining who is part of a group, a group does not exist. If a unit of people is not perceived to be a group, it is impossible to enact group processes, and to ultimately survive as a group. This is especially a problem online because new members frequently join groups, contribute once, and then never return

(Panciera, Halfaker, & Terveen, 2009). This pattern makes it difficult for online groups with highly permeable boundaries, or no clear boundaries at all, to persist.

Outcomes of boundaries. When people believe that boundaries are permeable, they are more likely to leave a group (Ellemers, Spears, & Doosje, 1997; Ellemers, van Knippenberg, De Vries, & Wilke, 1988; Ellemers et al., 1990). When boundaries are permeable and participants are faced with a threat, they prefer individual strategies such as exiting the group or continuing alone (Lalonde & Silverman, 1994). On the other hand, when boundaries are not permeable, participants prefer more collective response strategies such as soliciting help of other group members. These findings demonstrate that group boundary permeability affects cognitions and behavior of individuals within the group.

Stronger boundaries also lead to group identification. People prefer to identify with socially desirable or "prestigious" groups (Ashforth & Mael, 1989). Therefore, they may feel inclined to cognitively reframe the group they belong to if they know they cannot leave. Specifically, participants use more "social creativity strategies," such as downward social comparisons, when boundaries are stronger (Jackson, Sullivan, Harnish, & Hodge, 1996). When the boundaries are stronger (i.e. not permeable,) participants are more likely to identify with a group, even if it is low status, because there is no viable option to remove oneself from the group. Regardless of the status of the group, telling participants that the makeup of a group is stable leads to stronger feelings of in-group identification (Ellemers et al., 1990).

Boundary permeability also affects entitativity, an individual's recognition of a social unit as a group (Blanchard et al., 2018). Groups with stronger boundaries are

perceived to have more entitativity, or to have more "group-ness" (Blanchard et al., 2018). Within stronger boundaries, people are more likely to act as a group rather than as independent agents (Lalonde & Silverman, 1994). Groups need boundaries in order for people to recognize that the group exists, which allows for subsequent group processes to occur (Blanchard et al., 2018).

Entitativity

Importance of entitativity. An important feature in evaluating and predicting the success of online groups is entitativity. It is a starting point for fundamental group processes to occur (Blanchard et al., 2018). This study examines how group boundary permeability (i.e., ease of entry and exit from the group) affects perceptions of an online group's entitativity. There has been some preliminary support for group boundaries as an entitativity antecedent (via Blanchard et al., 2018), but permeability of group boundaries has not been specifically examined in online groups. In the current study, I focus on the permeability of boundaries of an online group to examine possible effects on observers' perceived entitativity.

Perceptions of entitativity. Individual perceptions of entitativity can vary by "chronic perceiver differences" (Lickel et al., 2000, p. 224). In other words, two people may rate the same group as having different levels of entitativity, depending on their own background and the context of the observation. Because entitativity is a perception of the individual person and not an objective quality of the group, it is necessary to examine current or potential members' self-reported levels of entitativity.

Importantly, people do not need to be members of a group to evaluate its characteristics. Potential group members' perceptions of entitativity can be manipulated by providing different pieces of information about the group, for example, by stating that

the group is made up of either friends or mere acquaintances. When asked to make judgments about groups with varying levels of entitativity, participants recalled the low- and high-entitativity groups differently in terms of their traits and behaviors (Johnson & Queller, 2003). This suggests that even outsiders of groups can distinguish between levels of entitativity and that subsequent perceptions vary based on the information provided about the groups' characteristics.

When a person perceives a group as having entitativity, his or her cognitive impressions of the group change. Specifically, groups with high levels of entitativity are processed more like an individual unit (i.e., a unified group) than a set of independent units (Lickel et al., 2000). People also place more value on their memberships in groups that have higher levels of perceived entitativity. People may value groups with more entitativity because those groups have more potential to act as causal agents and accomplish goals through collective action (Lickel et al., 2000).

Antecedents of entitativity. Originally, Campbell (1958) proposed four antecedents to entitativity: group member proximity, similarity, common fate and pregnance. While the first three antecedents are self-explanatory, pregnance is more opaque. Pregnance is a "closed figure, or completed boundary" (Campbell, 1958, p. 18). It refers to the physical structure of a group, and can be thought of as the way the members of the group are organized in space. For example, in a FtF group, we would observe pregnance if members were organized in a pattern that indicated the structure of the group, such as standing in a pack on one side of a fence at a rally, or sitting together in the same section of bleachers (Meneses, Ortega, Navarro, & de Quijano, 2008). If a

members of a group were sitting on an airplane in different rows, interspersed with other passengers, we would not readily perceive pregnance.

Later research has refined entitativity's antecedents. Established antecedents include degree of interaction, importance of the group, shared goals among members, common outcomes, similarity of members, duration of the group's existence, group size, and permeability of group boundaries (Blanchard et al., 2018; Lickel et al., 2000). Pregnance is related to boundaries, as they both pertain to the structure of the group. However, the concept of pregnance is studied less frequently and researchers now focus more on the boundaries of a group when studying group structure. Boundaries refer to the ease with which people can enter and exit a group, and are not limited to the physical structure of the group (Lickel et al., 2000).

I focus on permeability of boundaries as an antecedent of entitativity in this study, as it has been understudied in entitativity research. Previous effects of boundaries on entitativity have been small and not statistically significant (Blanchard et al., 2018). While much is known about the other antecedents of entitativity, boundaries has received the least amount of empirical attention, yet it may have a small, but important effect on entitativity. In addition, it is very valuable to study boundaries because it is one of the easiest antecedents to manipulate in online groups. A manager of an online group can change web page settings to require usernames, passwords, and verification for members to access group discussions (i.e. strengthen the group's boundaries.) It is much more difficult for a group leader to manipulate the members' level of interactivity, similarity, or history. Thus, boundaries have been understudied, they are one of the easiest to manipulate, and will be informative in explaining entitativity.

Boundaries, particularly how permeable they are, change entitativity perceptions. Groups with weak, permeable boundaries have lower entitativity than groups with stronger, less permeable boundaries (Lickel et al. 2000). In online groups, boundaries are often permeable because the barriers (physical, social, and psychological) to joining and leaving a group online are usually minimal. It is easy for people to enter and exit groups online, which presents a serious threat to sustaining entitativity. However, this can be altered relatively easily in online groups with the use of privacy settings and verifications for members to access online groups.

The present study examines permeability of boundaries as an antecedent of entitativity. Entitativity is a critical outcome because it is the starting point for group processes to occur (Blanchard et al., 2018). I examine the effects of boundaries by manipulating and measuring boundary permeability in an experimental online sports forum.

Social Presence Theory

Although we have identified antecedents of entitativity, we do not know the mechanism that explains how people perceive it. This is a black box problem; we do not yet understand why the antecedents, including boundaries, lead to entitativity. One possibility is social presence (Biocca & Harms, 2002).

Social presence theory emphasizes the interaction between the person and the technology, which makes it ideal for studying online group communication. It considers the mutual influence of people and technology as members communicate in a mediated environment. Though many definitions have been presented, as for social presence theory, I will refer to it in this study as:

> "a theory of the interaction of mind and technology focused on mediated interaction only, specifically how different technological forms and mediated embodiments of the other influence the processes and mental representations in social interaction" (Biocca & Harms, 2002, p. 11)

Social presence has also been defined and applied to research in computer science and other non-social science disciplines. The present definition was selected because of its relevance to social psychology, its parsimony, and the emphasis on the *individual's* perceptions of mediated social interactions (other definitions emphasize properties of the technology rather than individual perceptions) (Biocca, Harms, & Burgoon, 2003). Similarly, entitativity is an individual's perception of a group, rather than an objective group quality. Therefore, this definition best fits the research question in the present study and can also be measured from the individual's perspective.

Presence, social presence and copresence. The broad concept of *presence* is commonly studied by information communication technology (ICT) researchers. Presence is the psychological perception of "being there", and is a desirable characteristic for ICT (Casanueva & Blake, 2001). For ICT to be successful, the environment must have a high sense of presence so the participants feel immersed in the experience. This high sense of presence helps members feel that they are *there* and truly interacting with people, rather than just looking at a screen.

One type of presence is *social presence*. Other types of presence include place, physical, environmental, and personal presence (Bulu, 2012; Casanueva & Blake, 2001; Heeter, 1992). It is beyond the scope of this paper to review each form of presence in detail. While presence refers to the sense of "being there," *social presence* refers to the sense of "being there with others" (Hauber, Regenbrecht, Hills, Cockburn, &

Billinghurst, 2005). This is the most relevant type of presence for online, interacting groups.

The construct of social presence was originally developed by Short, Williams, and Christie (1976), and was defined as the degree of salience of the other person's presence for two individuals in a mediated communication interaction. The theory was originally used to compare new types of mediated communication to face-to-face communication. Short et al.'s (1976) measure of social presence focused primarily on features of the technology, or medium, in the interaction.

Since its original conceptualization, several competing taxonomies have been proposed to describe the levels of social presence (in fact, Biocca, Harms, & Burgoon, 2003 list over 15 definitions.) For example, some social psychologists view social presence as binary, in which the "other" is either there or not there. Social presence is also defined as the "extent to which other beings (living or synthetic) also exist in the world and appear to react to you" (Heeter, 1992, p. 263). Some researchers emphasize the role of *intimacy* and *immediacy* in the interaction (Gunawardena & Zittle, 1997), where intimacy refers to things like eye contact and smiling, and immediacy refers to perceived psychological distance between the communicators. More complex conceptualizations of social presence involve the mutual interdependence of behaviors in a mediated environment (Biocca et al., 2003). This range of definitions is clearly problematic.

Social presence needs to be defined in a way that lends it to clear conceptualization and measurement. Therefore, I use the following definition for this study: social presence is the "sense of being with another in a mediated environment" (Biocca & Harms, 2002). As stated previously, I focus on this definition because it

emphasizes the individual's perceptions of the social interaction, as opposed to an objective quality of the technology or communication process.

Levels of social presence. Social presence is conceptualized as having three hierarchical levels which build upon one another. The first, most basic level of social presence is the *perceptual level*, which is also referred to as *copresence.* Copresence occurs when two parties are aware of each other's presence in a mediated setting, and each individual independently believes that they have access to another intelligent being (Biocca & Harms 2002). In order to perceive copresence, an individual must feel that they are able to perceive the other(s), and the other(s) are able to perceive them (Nowak & Biocca, 2003). Copresence must occur first temporally before the other levels of social presence can be experienced.

The next level of social presence is the *subjective level*, or the perceived access to another's emotions and moods, intentions, and attentional engagement. In this stage, individuals form a mental model of another being and attempt to interpret the motivation behind the other's actions. The highest level of social presence is the *intersubjective level,* in which one party's actions are dependent upon another's and the parties agree upon some level of mutual awareness of each other.

The higher levels of social presence cannot occur without first achieving copresence, or the acknowledgment that another being is present and mutually aware of the observer. For this reason, copresence (and not the higher levels of social presence) is the primary focus of this study.

Copresence in online groups. Copresence develops at different speeds in FtF and online groups. Cognitive assessments of interpersonal interactions take longer in a

mediated context due to the lack of nonverbal cues and increased dependence on single impressions of limited information (Walther, 1996). In person, copresence is perceived immediately; one instantly notices other people around them and likely assess them as a group if the people, for example, are wearing the same jersey in a football game. Online, however, it takes longer for an observer to both "see" other members and to recognize that everyone has the same shirt on in their online avatar. This longer delay online occurs because cues are less abundant.

Different features of technology-mediated communication lead to varying levels of copresence. Factors that influence copresence include images, responsiveness, and realism of the representation of others, such that richer information and auditory and visual cues lead to higher levels of copresence (Campos-Castillo, 2012). For example, when someone joins a group conference call, there is a beep and the person is expected to announce him- or herself. As he or she begins to speak, the person entering the call and the people already on the line start to perceive copresence. It is obvious that a new member is now present in the group (i.e. high perceived copresence). In an asynchronous, text-only discussion forum, copresence takes longer to perceive. Cues are accumulated more slowly as people post on the forum at different times, much like when writing and mailing letters back and forth with someone. In this case, the available cues are sparse which makes it difficult to perceive copresence.

Boundaries and copresence. Like a beep on a conference call, strong group boundaries are another cue that can tell us something about a group. In online groups, boundaries signal a specific place for group interactions to occur. Copresence implies that people are mutually aware of each other and can have a social relationship in an online

setting (Zhao & Elesh, 2008). Cues, such as boundaries, help us determine whether we have "access" to other people, allowing for social relationships to form. If a group has strong boundaries, this indicates there is a specific location for social interaction with other group members whom we have access to. I propose that when group boundaries are strong, group members perceive that others are available, ready, and willing to interact about group-relevant topics.

Take for example an email group for the mothers of children in a preschool class. In this group, which requires a verified email address and an invitation to join, boundaries are very strong. The members may be more likely to perceive copresence, (i.e. that other members are present and available to interact) compared to a group with very permeable boundaries, such as a public online forum for all mothers with preschool-aged children. In this case of a group with weaker boundaries, there may be lots of potential people to interact with, multiple pages and channels for discussion, and a great deal of topics to choose from, making it more difficult to determine who is available and potentially willing to interact (therefore copresence would be lower.)

In addition to demarcating a specific place for group interaction, cues also reduce uncertainty, allowing us to process information more quickly (Daft & Lengel, 1986). According to uncertainty reduction theory (Hogg, 2000), people are inherently motivated to evaluate themselves and groups in order to reduce contextual uncertainty. When there are many environmental cues available (about strong boundaries, for example) observers can reduce uncertainty by making evaluations about the group. One possible evaluation is that the group has strong boundaries. Further, I propose that when observers perceive strong boundaries, they are also more likely to perceive the outcomes of boundaries, such

as copresence and entitativity, to be stronger. In sum, more cues allow for clearer, quicker evaluations of groups and their features.

Copresence as an explanatory mechanism. It is possible that copresence provides an explanation for how some group characteristics (e.g. boundaries, interactivity,) lead to entitativity (Blanchard et al., 2018). When observers notice cues, such as boundaries to enter the group, this indicates that there are members present and available in the group. Boundaries indicate the presence of "ingroup" and "outgroup" members (Gaertner & Schopler, 1998). Further, researchers have established that copresence predicts key outcomes for online groups. For instance, higher perceptions of copresence were found to predict users' intention to continue using a technology-mediated communication software (Xu, Zhang, & Li, 2011) and higher levels of community participation (Shen & Khalifa, 2008). These outcomes can only occur if people believe that members are *there,* and available to interact. By highlighting group features such as boundaries by providing more cues, it may make it more obvious to observers that people in an online group are *present,* available, and ready to communicate.

Cognitions about groups take longer to develop online (Walther, 1996), but when copresence is increased, people may perceive entitativity more quickly and with less effort because there are more cues available when initial perceptions are formed (Daft & Lengle, 1986). The significance of understanding this relationship is widely applicable because improving social presence of online environments is a goal of managers, educators, developers, and leaders of social groups (Biocca et al., 2003; Farzan, Dabbish, Kraut, & Postmes, 2011). By increasing copresence, facilitators can improve

communication and therefore make collaborative virtual work and social interactions run more smoothly. This research provides insights into how social presence can be improved by manipulating characteristics of online groups, specifically the group boundaries, to increase social presence and thus entitativity.

Research Hypotheses

This study examines the boundary-related social processes (e.g. being "approved" by an administrator) and technical features (e.g. verifying one's identity and entering a password) in an online group. Specifically, I examine whether perceptions of group boundaries increase observers' perceptions of entitativity (H1) and perceptions of copresence (H2). I also examine whether perceptions of copresence predict entitativity (H3).

Another contribution is that by determining whether copresence mediates the relationship between boundaries and entitativity (H4), I help explain the causal mechanisms by which boundaries leads to entitativity. By understanding how the antecedents contribute to perceptions of entitativity, anyone who uses ICT and participates in virtual groups may be better able to customize group features to achieve higher levels of copresence and greater perceptions of entitativity, both of which are imperative for the survival of groups (Hogg, Hohman, & Rivera, 2008). Thus, my hypotheses follow:

H1: Stronger boundaries will increase entitativity.
H2: Stronger boundaries will increase copresence.
H3: Higher levels of copresence will increase entitativity.
H4: Copresence partially mediates the relationship between boundaries and entitativity.

In addition to measuring participants' perceptions of group boundaries, I also use two experimental conditions to determine if observers' perceptions are affected by the salience of the boundary cues. In the control condition, where no additional boundary cues are introduced, boundary perceptions are expected to be relatively low but will still vary between individuals. In the experimental condition, in which more cues about boundaries are provided, boundary perceptions are expected to be higher in general, but will still vary between individuals. It has been suggested that generally, stronger boundaries lead to entitativity. But, it is possible that this relationship will be stronger when participants are exposed to more cues and can perceive boundaries more readily (Daft & Lengel, 1986). When specific features of the online forum are highlighted it is possible that the relationships will be stronger because the social and technical cues will be more salient to the participants. Therefore, my final hypotheses are as follows:

> **H5**: The means for boundaries, copresence, and entitativity will be higher in the experimental condition compared to the control condition.
> **H6**: The relationship (direct and indirect) between boundaries and entitativity will be stronger in the experimental condition than the control condition.

CHAPTER 2: METHOD

The experimental materials used in this study were created and have been used by an existing research laboratory at UNC Charlotte. Most of the materials have been pilot tested with multiple experiments on related topics, but a new measure (of copresence) was added as well as a new manipulation (of boundaries) that have not previously been tested with this procedure.

Participants

When conducting structural equation modeling and multiple group analysis, it is recommended that there are at least 200 participants per group (Kenny, 2011). The original data set included 547 participants who initiated the online survey. The control condition was collected in two phases, as data collection was ongoing before the study proposal, and then a few minor changes were made following the proposal meeting. These changes included adding four additional items to measure boundaries, and two items to measure participants' perceived "realism" of the forum (i.e. whether they believed it was a real forum.) There were 125 respondents in the first phase and 141 respondents in the second phase (after changes were made), for a total of 266 in the control condition. There were 281 participants who initiated the survey in the experimental condition (which was collected all as one phase.)

Before conducting analysis, I removed 28 respondents from the dataset because they had a standard deviation of 0 because they selected the same value for every item. For example, 19 respondents selected all 4's, four selected all 7's, etc. These participants were removed for concern of lack of attention to the items and the study. I was left with

519 total participants, with 250 in the control condition (113 from phase one, and 137 from phase two) and 269 in the experimental condition.

Because this study focuses on observers' perceptions of online groups, it is imperative that the participants thought the experimental stimuli were realistic and believed they were observing a real group of people. (Additionally, preliminary analysis revealed that the items measuring perceived realism of the forum were strongly correlated to all study variables.) Therefore, I used the items "This forum was realistic" and "I believe this group of forum users really exists" to screen out participants. If participants answered with a 1 or a 2 (Strongly Disagree or Disagree) to either or both items, indicating that they did not "believe" the experimental forum was real, they were excluded from analysis. This resulted in eliminating 58 total participants.

Those in the first phase of control condition data collection were also excluded (n = 113), because they did not have the opportunity to respond to the realism questions or the four additional boundary items (and therefore I could not measure their perceived realism of the forum.) The final count of participants was 348, with 109 in the control condition and 239 in the experimental condition. (Supplemental analysis including these participants were also conducted. When all participants were included in the model, the relationships among variables were similar; the pattern of significance was generally the same. Only two relationships differed, for history and interactivity.)

The participants were recruited from SONA, (the university's online psychology participant pool recruitment system). I used Qualtrics online survey software to administer the web-based survey. Students received a small amount of course credit for their participation. Data collection began in December of 2017 and concluded in April of

2018. Respondents consisted of 50% (172) women and 50% (172) men; while four participants did not provide gender information. The average age was 19.58 years (*SD* = 2.70), and the majority (59.2%) were freshmen, with 26.1% sophomores, 10.3% juniors, and 4.3% seniors. The ethnicity of participants was reasonably representative of the university at which the data was collected, with 60.6% White, 20.4% Black/African American 7.2% Latino/Hispanic, and 8.9% Asian American.

Procedure

Once participants agreed to participate in the online study via SONA, they were directed to a Qualtrics web page containing an informed consent form and instructions. The participants followed a link which takes them to a fictitious UNC Charlotte football discussion forum. This forum was created with actual discussion forum software and is a realistic discussion with various threads, posts, replies, user avatars, and time stamps. Forum users' avatars are photographs of actual UNC Charlotte students, but names, personal information, and usernames are all fictitious. (For a snapshot of the forum, see Appendix A.) Participants were told this was an actual discussion forum used by university students. They were instructed to read through the threads, and then return to the survey to fill out questionnaires.

The entire procedure took an average of 17 minutes for each participant. Participants received course credit immediately after completion of the survey, regardless of their responses.

Manipulations

In the control condition (in which boundaries were not manipulated), participants were directed to the sports forum and asked to read through the threads. They then

returned to an online survey in Qualtrics. At the beginning of the survey, the participants entered a username for themselves and wrote a reply to one of the threads in the forum. They then completed the rest of the questionnaires and a demographics measure.

In the experimental condition, I manipulated technical and social features of boundaries of the group to make them more salient to observers. To manipulate technical boundaries, participants were required to "verify" themselves as UNC Charlotte students, and enter a forum password to access the discussion board. Participants were asked to enter the last 3 digits of their student ID numbers (this is not enough information to individually identify them) and they received a forum password upon signing up for the study. Once the participants entered their ID number and the correct password (which was verified by a Qualtrics forced response), they were able to access the discussion board and read through the posts. Participants who did not enter the correct password and therefore did not fill out the survey were not included in the dataset.

Participants in the experimental condition also created a username and posted a reply to one of the threads. To manipulate the social feature of boundaries, the participants were informed that an administrator must approve their reply to the forum before it is posted publicly to the group. This is intended to increase the participants' perception of other people seeing them in the group. Additionally, participants completed several "screener" questions, which ask about their interest and engagement in the university and sports. Sample items include "I attend athletic events at UNC Charlotte" and "I have a strong sense of school spirit" (Both rated on a scale from 1 to 7, Strongly Disagree to Strongly Agree.) Instructions indicated that participants must meet a minimum standard to join the group (in reality, no participants were excluded from

completing the survey). Once they were notified they were "approved" to join the group, participants were also told that they will remain a member of the forum until it is deactivated. Boundaries are made more salient and stronger (i.e. less permeable) by emphasizing that members must be approved in order to communicate with the group, and that membership is relatively permanent (i.e. it is difficult to join the group and difficult to leave the group). Participants were informed at the end of the survey that the forum is not actually live, and therefore they are not members of the group.

Materials

Sports forum. The sports forum was created with php software. It includes nine football-related threads with topics ranging from "Tickets for the Game" to "Parking on Game Day". (In the conditions with the social boundaries manipulation, there are ten threads, including an "Introductions" thread.) There are ten unique fictitious users (that were created by research lab members) with usernames and avatar photos. The forum users discuss different topics within the threads by making comments, asking questions, and replying to other members' posts. Because it was designed with actual discussion forum software, the sports forum is intended to resemble an actual, live discussion forum as closely as possible, and the participants were told that this is a forum currently used by UNC Charlotte students (until they view a debriefing message at the end of the survey, which reveals that the group was fictitious.) To increase authenticity of the forum, participants' messages include minor spelling errors and grammatical mistakes, emoticons, and abbreviations (e.g. IDK for I don't know).

Measures

Entitativity. Entitativity was measured with three items from a measure that was developed by Blanchard et al., (2018). The three items are "The sports forum users are a unit", "The sports forum users are a group", and "The sports forum users feel like a group to me". Items are rated on a scale from 1 to 7 ranging from Strongly Disagree to Strongly Agree.

Copresence. Copresence was assessed using six items. Sample items include "I noticed the sports forum users" and "The sports forum users noticed me" (Harms & Biocca, 2004). The six items were reworded from the past tense to the future tense, and are listed in Appendix B. (The items were reworded because participants were told that their posts would not be visible to the other group members until they were "approved.") In a validation study, Cronbach's alpha for these six items was .84, indicating acceptable internal consistency (Harms & Biocca, 2004). This measure is also scored on a scale from 1 to 7 ranging from Strongly Disagree to Strongly Agree.

Boundaries. Permeability of boundaries was measured with the two items from the previously mentioned study of entitativity and its antecedents (Blanchard et al., 2018). Four additional items were also added to measure boundaries, beginning in phase 2 of the control condition data collection. The two original items from Blanchard et al.'s (2018) measure are "It is easy to join this forum" and "It is easy to leave this forum". These items were not found to fully demonstrate construct validity in a validation study (Blanchard et al., 2018). That is, the boundaries items were expected to be related to entitativity such that stronger boundaries were positively correlated with entitativity. However, this relationship was not significant in one sample of participants evaluating online groups, and the items had to be removed from the model in a study of work groups

and groups formed around social media status updates, because they did not properly load onto their scale. The items only supported the predicted relationship in a sample of participants evaluating existing FtF social groups. (Blanchard et al., 2018).

Therefore, additional items were developed with subject matter experts, and were included in the survey to better capture participants' perceptions of group boundaries. These items are "It is easy to become a member of this forum," "It is easy to stop being a member of this forum," "There are strong boundaries to enter this forum," and "There are strong boundaries to leave this forum." All items are rated on a scale from 1 to 7 ranging from Strongly Disagree to Strongly Agree, and the first four items are reverse-scored so that higher scores indicate perceptions of stronger boundaries.

Control variables. Two control variables, sports interest and computer experience, are also included in the study. The item measuring sports interest is "I am interested in sports", which is scored on a scale from 1 to 7 ranging from Strongly Disagree to Strongly Agree. Computer experience is similarly measured with one item, "I have had a lot of previous computer experience" and is measured on the same scale. These control variables have been shown to be related to entitativity's antecedents and outcomes (Blanchard et al., 2018).

Demographics. Demographics items were used to measure participants' class standing, gender, age, and ethnicity.

Additional model testing. Previous research (e.g. Blanchard et al., 2018; Lickel et al., 2000) shows that similarity, interactivity, common goals, and history of interaction are important antecedents of entitativity. After testing the hypothesized model (which only includes boundaries as an antecedent), I test a second model which includes these

additional variables as a baseline to show the effects of boundaries above and beyond the established antecedents. This is done in order to show the incremental value of including boundaries as a predictor of entitativity.

Similarity is measured with four items, including “The sports forum users are alike”. Interactivity is measured with seven items, including “The sports forum users communicate with each other”. Common goals is measured with three items, including “The sports form users share a common goal”. History of interaction is measured with four items, including “The sports forum users have been interacting for a while” (Blanchard et al., 2018). All items are rated on a scale from 1 to 7 ranging from Strongly Disagree to Strongly Agree.

The primary goal of this study is to better understand *boundaries* as an antecedent of entitativity. I focus on copresence as a potential explanatory mechanism of this relationship. However, because there are other established antecedents of entitativity, I test an additional model with these antecedents to determine whether the effects of boundaries on entitativity exist above and beyond the other antecedents. While it is not a focus of this study, it is possible that copresence is also important in explaining the relationships between the other antecedents and entitativity. However, because I only manipulated boundaries (and not the other antecedents) any causal inferences about additional variables must be made with caution. In the discussion, I make recommendations for furthering this area of research.

CHAPTER 3: RESULTS

First, I conducted a confirmatory factor analysis for all items used in the study (i.e. those measuring the focal variables and the additional antecedents of entitativity). This was done to provide a stronger test of convergent and divergent validity in the measures used, by showing that the antecedents are distinct from entitativity and each other.

Then, I tested the proposed model with the entire sample (without separating them into control and experimental groups). This was done to determine if the model fits well enough to proceed with multiple group analysis, but leaves room for improvement or deterioration in the fit of the model when the groups are separated. Next, I tested the additional model including all entitativity antecedents. Lastly, I considered the hypothesized model as an outcome of the experimental manipulation and tested for group differences between the control and experimental condition. The analyses are reported in order from least complex to most complex. I first introduced and tested a new explanatory mechanism for an established model, and then conducted multiple group analysis, a relatively new way to test experimental manipulations via SEM.

Confirmatory Factor Analysis

With all original items (i.e., focal variables and additional entitativity antecedents), the confirmatory factor analysis (CFA) had relatively poor fit to the data, $\chi^2(474) = 1551.74$, $p < .001$, RMSEA = .08, CFI = .82, SRMR =.07. Following current best practices, items that loaded onto different scales or were too highly correlated with other items on their own scale were removed. I also considered whether constructs needed to be broken into second-order factors.

Specifically, factor loadings suggested the boundaries items were not loading well onto a single factor (the two items that describe *difficulty* in joining and leaving the group both had factor loadings of -.09.) It is plausible that perceptions of boundaries are not simply on a continuum from weak to strong but are actually better conceptualized as two different constructs. Therefore, I split the boundaries construct into two subscales, strong boundaries (e.g. "There are strong boundaries to enter this forum") and weak boundaries (e.g. "It is easy to join this forum").

Further, copresence item loadings suggested that they should be two factors that loaded onto a second-order factor. These factors were based on the wording of the items. Half of the items (1,3, and 5) reflect whether the participant noticed the sports forum users (e.g. "I noticed the sports forum users.") The other half (2, 4, and 6) reflect whether the participant believes the sports forum users will notice them (e.g. "The sports forum users will notice me.") Lastly, similarly to a previous study of this measure of entitativity and its antecedents (Blanchard et al., 2018), the high covariance among similarity and common goals suggested that they should load on to a second-order factor, previously referred to as "homogeneity".

After creating the second-order factors for copresence and homogeneity, I continued an iterative process in which one modification was made at a time to determine whether the fit of the model improved. Theoretical importance always took precedence over empirical findings so that no critical items were removed from the scales. For example, the item "I noticed the sports forum users" is a core item of the copresence scale, and would never be considered for removal, regardless of modification indices.

A total of four items were removed from the main study variable scales (one from boundaries, two from copresence, and one from entitativity.) Seven items were removed from the additional entitativity antecedent variables (three from interactivity[1], one from similarity, two from history, and one from common goals.) The final CFA had good fit to the data $\chi^2(184) = 368.29$, $p < .001$, RMSEA = .05, CFI = .95, SRMR = .04.

Descriptive Statistics and Correlations

The means, standard deviations, and correlations among the study variables are presented in Table 1. Strong boundaries was positively correlated with entitativity, as expected ($r = .23$, $p = .00$); that is, stronger boundaries are related to higher entitativity. However, strong boundaries was not significantly correlated with copresence ($r = -.05$, $p = .33$). Weak boundaries was positively correlated with entitativity ($r = .41$, $p = .00$), and positively correlated with copresence ($r = .32$, $p = .00$). Strong boundaries and weak boundaries were negatively correlated with each other ($r = -.11$, $p = .05$). Entitativity and copresence were positively correlated, as expected ($r = .35$, $p = .00$).

Mediation

I tested the proposed mediation model using structural equation modeling (SEM), to test Hypotheses 1-3. This initial test of the mediation model includes all participants from both the control and experimental groups ($N = 348$). As a result of the CFA, the originally proposed model was adjusted slightly to reflect the two boundaries constructs (weak boundaries and strong boundaries as separate constructs). To test the significance of the indirect effect of boundaries on entitativity (H4), I used the bootstrapping method (Preacher & Hayes, 2008). This method involves resampling with replacement of cases

[1] Blanchard et al. (2018) reported similar problems with interactivity across multiple studies.

from the original data. The a and b paths in the model (boundaries to copresence, and copresence to entitativity, respectively) are estimated each time the data is resampled. This occurs 5,000 times. At the end of this process there are 5,000 estimates of the indirect effect, and the model is run on each sample.

The hypothesized model had very good fit to the data $\chi^2(52) = 103.10$, $p < .001$, RMSEA = .05, CFI = .97, SRMR =.04. (See Figure 1 for the model.) However, Hypotheses 1-4 were partially supported. Hypothesis 1 stated that stronger boundaries would increase entitativity, and it was supported. In fact, stronger boundaries did increase entitativity (= .39 $p < .001$). However, weak boundaries also positively predicted entitativity (= .58, $p < .001$), suggesting that very weak boundaries *and* very strong boundaries predicted more entitativity.

Hypothesis 2 stated that stronger boundaries would increase copresence. This hypothesis was not supported. Results indicated that strong boundaries did not increase copresence (= -.02, $p = .74$). However, weak boundaries was positively related to copresence (= .39, $p < .001$). Hypothesis 3 stated that higher levels of copresence would increase entitativity, and it was supported; copresence positively predicted entitativity (= .16, $p < .001$). Lastly, Hypothesis 4 stated that copresence would mediate the relationship between boundaries and entitativity, and it was partially supported. The indirect effect of strong boundaries on entitativity through copresence ($b = .00$) was not significant ($p = .74$). However, the indirect effect of weak boundaries ($b = .05$) was small, but significant ($p = .01$). Therefore, copresence mediated the relationship between weak boundaries and entitativity, but did not mediate the relationship between strong boundaries and entitativity.

An alternative model was also tested in which there was no direct path from boundaries to entitativity (i.e. full mediation, instead of partial mediation.) The fit of the model was moderately good, $\chi^2(54) = 195.49$, $p < .001$, RMSEA = .09, CFI = .91, SRMR =.08. However, the original model with partial mediation had significantly better fit than the fully mediated model $\chi^2(2) = 92.40$, $p < .001$. Therefore, I continued to use the model which included the direct paths (partial mediation) in further interpretation.

After testing the hypothesized model, I introduced the other established antecedents of entitativity including interactivity, history, and homogeneity (the second order factor including similarity and common goals.) The initial model had good fit to the data $\chi^2(219) = 430.19$, $p < .001$, RMSEA = .05, CFI = .94, SRMR =.05. Modification indices suggested there should be a path added from interactivity to copresence. Although interactivity was not experimentally manipulated, this theoretically makes sense because interactions need to occur between people in order for there to be copresence, or mutual awareness. Therefore, I added a direct path from interactivity to copresence to the model, as well as the indirect effect of interactivity on entitativity through copresence. This slightly improved the fit of the model $\chi^2(218) = 419.03$, $p < .001$, RMSEA = .05, CFI = .94, SRMR = .04.

Once again, an additional model was tested with the direct paths from boundaries to entitativity removed (to test full mediation), and the model had moderately good fit $\chi^2(221) = 431.69$, $p < .001$, RMSEA = .05, CFI = .94, SRMR =.04. However, the fully mediated model did not fit significantly better than the partially mediated model $\chi^2(2) = 1.51$, $p > .05$. Therefore, I. proceeded to use the model which included the direct paths in further interpretation.

Even though the CFI for the model with all entitativity antecedents was slightly lower than the accepted cutoff of .95, no additional modification indices made theoretical sense to adjust the model. Therefore, I continued with interpretation of the current model, with the expectation that the two groups (experimental and control condition) may have different fit indices if they were separated, which is the general practice in multiple group models.

With the inclusion of established entitativity antecedents, Hypotheses 1-4 were no longer supported. See Figure 2 for the complete model. Hypothesis 1 stated that stronger boundaries would increase entitativity, but stronger boundaries no longer predicted entitativity (= .00 p = .98). Weak boundaries also no longer predicted entitativity (= .11, p = .27).

Hypothesis 2 stated that stronger boundaries would increase copresence. This hypothesis was again not supported; results indicated that strong boundaries did not increase copresence (= -.08, p = .17). However, weak boundaries was still positively related to copresence (= .24, p < .01), which was contrary to Hypothesis 2. Hypothesis 3 stated that higher levels of copresence would increase entitativity, and it was no longer supported; copresence did not significantly predict entitativity (= .09, p = .07). Lastly, Hypothesis 4 stated that copresence would mediate the relationship between boundaries and entitativity, and it was not supported. The indirect effect of strong boundaries on entitativity through copresence was not significant (b = -.01, p = .28) and the indirect effect of weak boundaries was not significant (b = .02, p = .11). Therefore, copresence did not mediate the relationship between boundaries and entitativity when other entitativity antecedents were included in the model.

Some of the entitativity antecedents significantly predicted entitativity in the expected direction. This included history (□ = .77, p = .01), and homogeneity (□ = .37, p < .001). However, interactivity did not significantly predict entitativity (□ = -.23, p = .28), which was unexpected. Additionally, although it was not hypothesized, interactivity significantly predicted copresence (□ = .25, p < .01). But, the indirect effect of interactivity on entitativity through copresence was not significant (b = .03, p = .11). At this point, I stopped the main mediation testing to begin the experimental testing.

Manipulation Checks

Hypotheses 5 and 6 focused on the differences in study variables between the control and experimental conditions. To test Hypothesis 5, which states that the means for boundaries, copresence, and entitativity will be higher in the experimental condition compared to the control condition, I first used t-tests to compare the means of the two conditions. According to the results of the t-test, Hypothesis 5 was not supported. For the strong boundaries items, the control group had a mean of 3.70 (SD = 1.24) and the experimental group had a mean of 3.75 (SD = 1.23). These scores were not significantly different, t(209) = -.40, p = .69. On the weak boundaries measure, the control group had an average score of 5.18 (SD = 0.99) and the experimental group had an average of 5.11 (SD = 1.04). These scores were not significantly different, t(216) = .61, p = .54.

Copresence scores also did not differ by group t(206) = -0.66, p = .51; (control group mean = 4.78; experimental group mean = 4.47). Entitativity scores did not differ by group, t(225) = .11, p = 91 (control group mean = 4.75, experimental group mean = 4.73). Means, standard deviations, and t-test results for all study variables can be found in Table 2. None of the study variables were significantly different across the two groups.

These results suggest that the manipulation of boundaries was not successful, and that (preliminarily) Hypothesis 5 was not supported. Those who were exposed to cues of stronger boundaries (i.e. requiring a password and verifying student identity) in the experimental condition did *not* perceive stronger boundaries than those who were not exposed to the cues. Subsequently, the experimental group did not perceive more copresence or more entitativity.

Multiple Group Analysis

Although there was no difference in study variables in the t-test results, I used multiple group analysis to compare the model in more depth between the groups (and to further test Hypothesis 5 and test Hypothesis 6.) Because the only difference between the two groups was the manipulation of boundaries, I only conducted multiple group analysis for the model containing the focal variables of boundaries, copresence, and entitativity. The additional antecedents were not manipulated and therefore were not expected to differ across the control and experimental groups. Further, the required sample size to detect effects increases with each additional parameter that is estimated (Wolf, Harrington, Clark, & Miller, 2013).

The first step in multiple group analysis is to test configural invariance, or whether the structure of the model (i.e. number of factors and factor-indicator relationships) is reasonable across all groups (Kenny, 2011; Vandenberg & Lance, 2000). In other words, this step tests whether the same number of factors exist in each group but does not compare the values of the factors. I tested the model for configural invariance, and the fit was good, $\chi^2(104) = 168.53$, $p < .001$, RMSEA = .06, CFI = .96. This suggests

that structure of the model fits well for both groups, and it is appropriate to proceed with multiple group analysis.

The next step in multiple group analysis is to test the invariance of factor loadings, or whether the factor loadings for items are equivalent across groups (Vandenberg & Lance, 2000). This is also known as metric or weak invariance. This test is done by forcing the factor loadings to be equivalent across groups and determining whether the fit of the model declines from the previous test (in which no equality constraints were introduced.) In this case, when factor loadings were forced to be equivalent, the fit of the model worsened slightly, $\chi^2(118) = 190.79$ $p < .001$, RMSEA = .06, CFI = .95, but the difference was not statistically significant, $\chi^2(14) = 22.26$, $p = .07$.

The next step is to test the invariance of intercepts for each item (which can also be interpreted as the mean for individual item when the factor mean is zero) (Vandenberg & Lance, 2000). This is referred to as scalar invariance and is done by forcing intercepts to be equivalent across the groups and observing changes in the fit of the model. When intercepts were constrained to be equal, the fit of the model worsened, $\chi^2(123) = 206.74$. $p < .001$, RMSEA = .06, CFI = .95. When compared to the previous model, there was a significant difference in the chi-squared values $\chi^2(5) = 15.95$, $p < .01$. See Table 3 for the results of the multiple group analysis tests for configural, metric, scalar, and factor mean invariance.

Factor mean invariance would be the next step in multiple group analysis if the item intercepts were invariant across the groups. However, because the model fit broke down at the previous step, this test is not interpreted. Testing the difference in regression weights across the groups would be another subsequent step. This test was not conducted

because the model was shown to be nonequivalent at an earlier step (scalar invariance). Therefore, Hypotheses 5 & 6 could not be tested with multiple group analysis.

Because the fit of the model *decreased* when intercepts were forced to be equal, this suggests that at least one of the intercepts is in fact different across the two groups. I then tested a model where all intercepts were constrained to be equal across groups except for the second copresence item, which reads "The sports forum users will notice me." (This item was identified based on modification indices.) When this item was allowed to be freely estimated across the two groups, the fit of the model was good, $\chi^2(122) = 195.93$. $p < .001$, RMSEA = .06, CFI = .95. The fit was significantly improved from the previous model $\chi^2(1) = 10.84$, $p = .001$. This means the intercept for this item is in fact different across the two groups. The intercept for this item is higher in the experimental condition than the control condition (experimental group = 4.46, control group = 4.04).

I conducted this same analysis for other items as suggested in the modification indices, but none produced a significant improvement in the fit of the model. Therefore, one item driving the difference between the groups was the single copresence item on the "Copresence – They notice me" factor.

CHAPTER 4: DISCUSSION

The aim of this study was to investigate the relationship between permeability of group boundaries and entitativity, and also introduce copresence as a new causal explanation for this relationship. I drew upon previous research on entitativity and social presence theory to propose an explanatory model. Further, the relationships were tested in an experimental setting in which I attempted to manipulate participants' perceptions of boundaries. I expected to observe higher mean scores and stronger relationships in the experimental condition.

Some of the findings from the present study mirrored previous research. That is, prior studies have shown that boundaries may only have a small effect on entitativity (Blanchard et al., 2018). In this study, I found that while boundaries are related to entitativity when examined in isolation, the relationship was no longer significant when other antecedents were introduced. Perhaps most interestingly, the relationship between boundaries and entitativity is more complex than described in prior studies.

Based on extant literature, it was expected that stronger boundaries would be a more "favorable" group quality, and would lead to more copresence and more entitativity (Campbell, 1958; Lickel et al., 2000). However, in this study, it was actually *weak* boundaries that more strongly (and positively) predicted both copresence and entitativity. Further, the only relationship that remained significant after the inclusion of other entitativity antecedents was the relationship between weak boundaries and copresence. This indicates that weak boundaries is not only conceptually different from strong boundaries, but it may be an even more important predictor than strong boundaries when studying virtual groups.

Prior research suggests that copresence is a key component of online interactions, including discussion forums (Campos-Castillo, 2012). We also know that entitativity is crucial for group success. In the present paper, I proposed that these two constructs are related and that copresence may provide an explanation for how people perceive entitativity. Copresence was a weak predictor of entitativity in the first model tested, but was not a significant predictor of entitativity in the second model (where additional entitativity antecedents were included.) Copresence was only found to mediate the relationship from weak boundaries to entitativity in the original model with no additional antecedents. This implies that while copresence and entitativity may be related, other established antecedents are better predictors of entitativity than copresence.

Theoretical Implications

A key finding in this study was the boundaries construct was best represented as two separate factors: weak boundaries and strong boundaries. Boundaries has not previously been conceptualized as two separate factors in this way. This finding suggests that the current conceptualization of group boundaries in the social psychology literature may be too simplistic. Further, the two factors had unique relationships with the other study variables. Specifically, both weak boundaries and strong boundaries both positively predicted entitativity, but weak boundaries was a better predictor. Weak boundaries positively predicted copresence, but strong boundaries did not. Previous studies of group boundary permeability have only emphasized the effects of strong boundaries, but in the current study, weak boundaries were more powerful in predicting both entitativity and copresence.

There could be several explanations for this unexpected relationship. One possibility for the positive relationships between weak boundaries and both entitativity and copresence is that a group with weaker boundaries may be perceived as more welcoming and appealing to new members. One way to understand this example is to consider a sorority at a college. This type of group tends to have rigorous standards for accepting and integrating new members (e.g. "pledging".) Prospective members may view this process as a difficult hurdle to cross and feel that once they enter the group, it is very difficult to exit because they are considered a member for life. In other words, the group has very strong boundaries.

However, at the same time, these groups also tend to be very visible and do a lot of recruitment for new members. Further, during their recruitment period, the members may want the group to appear friendly and welcoming to join. There are clear steps required to participate, and current members may make it seem possible for anyone on the college campus to join the group. Because they are transparent and open about wanting new members to join, the boundaries may also simultaneously be viewed as weak. In this case, the group may have both strong and weak boundaries, and still have many of the qualities of a highly entitative group (i.e. similarity, common goals, history of interaction, and interactivity).

Another possibility is that weak boundaries may be uniquely valuable for *online* groups. Classic entitativity research (i.e. Campbell, 1958) only theorized about FtF groups. Early descriptions of boundaries emphasized the physical space in which groups interact. It is plausible that boundaries are not evaluated the same way in a virtual setting. That is, because there are no physical boundaries to online groups (such as walls, doors,

or fences) boundaries may be perceived entirely differently. Therefore, boundaries may have different relationships with other constructs of interest online. In a physical setting, strong boundaries (such as a fence to separate insiders and outsiders) may be desired by group members. Online, where users often expect immediate connections and instant feedback, stronger boundaries may be viewed as a hassle or an inconvenience to accessing the group and its members. This may prevent or slow down the perceptions of other key group characteristics, such as entitativity.

Boundaries also had an unexpected relationship with copresence; that is, weaker boundaries predicted higher levels of copresence. The possible explanations for this finding are similar to those mentioned above. Weaker boundaries may indicate a more "welcoming" group, which could lead to the belief that members are available online and willing to interact. Weaker boundaries may also be related to copresence because the group platform itself is easier to access when there are fewer obstacles to communicate with others. For example, if one has to log into a website, enter a password, and wait for their message to be approved by an administrator, it would take longer for other group members to notice a post and begin a conversation.

In sum, the construct of group boundaries needs to be substantially re-conceptualized or at least re-examined in the current literature. Classic definitions of boundaries did not consider online groups, and there is a need to investigate what this property means for virtual interactions.

Practical Implications

The results of this study also have implications for practitioners, specifically those who manage online groups or forums. While previous research suggests that stronger

boundaries are beneficial for groups, in this study I discovered this may not always be true. In fact, it may be beneficial for online groups to have *weak* boundaries, especially if group facilitators want to increase perceptions of copresence and entitativity.

There are many ways to manipulate the permeability of online group boundaries. For example, administrators can make groups publicly available so that both members and non-members can view the group's interactions. The duration of membership can also be manipulated, such that it is easy for members to enter and exit from the group, rather than require a complicated process to deactivate user accounts.

Another area for group administrators to focus is on establishing copresence in online groups. While copresence was only a significant predictor of entitativity in the first model (without additional antecedents) it is still a key component of online group interactions. Group members need to perceive that others are available in order for the group to sustain. They also need to perceive that other group members can see *them.* This study demonstrated that copresence is higher when observers of the group perceive weaker boundaries. To strengthen perceptions of copresence, administrators of online groups can open the boundaries of the group so that more people are able to join, notice, and interact with each other. By making it easier for more people to join the group, this may create a sense of awareness that others are available to interact, and that members feel they are noticed in the group.

In conclusion, theory that was developed in consideration of only FtF groups may not be directly applicable to online groups. One major difference is that boundaries are perceived differently (i.e. strong and weak boundaries are separate constructs, rather than one dimension.) Second, it is possible that weak boundaries are a more favorable quality

for online groups (in terms of predicting copresence and entitativity, two desirable group characteristics.) In previous studies it has been shown that stronger boundaries are valuable for group success (Ellemers, Spears, & Doosje, 1997; Ellemers, van Knippenberg, De Vries, & Wilke, 1988; Ellemers et al., 1990). It is not yet clear why this may not be the case online, but possible explanations are that a group with weak boundaries may be viewed as more welcoming to new members, or that stronger boundaries may be viewed as more of a hassle to evaluate and interact with online groups.

Limitations

One limitation of this study was the number of participants decreased the power of the analysis, making it difficult to detect significant effects. Though a sufficient number of participants was originally collected (with over 200 participants in each group), many participants had to be removed due to lack of attention or failing to believe study materials were realistic. Further, additional items to measure boundaries were introduced after data collection began. After data collection was complete, I discovered that the items revealed two factors of boundaries, strong and weak boundaries, which were uniquely important. Therefore, a sizeable number of participants had to be excluded from analysis because they did not complete all of the items.

Additionally, a shortcoming in this study was the manipulation was not effective in changing participants' perceptions of boundaries. It was expected that the focal study variables would differ across the two groups as a result of the experimental manipulation. But, only one item (measuring copresence) differed across the groups. This meant that Hypotheses 5-6 could not effectively be tested. Though there was enough variation in

perceptions of boundaries to test the hypothesized model with all participants, the comparison across groups was not effective beyond demonstrating a difference in one item measuring copresence.

Future Research

In future studies, researchers should consider including measures of both strong and weak group boundaries to fully capture the construct. Though this study provided preliminary support for boundaries as two separate factors, more data is needed to confirm whether this is a stable finding. This study only considered an online group, and it is also not known whether the concept of strong and weak boundaries also applies to FtF groups. Boundary conditions need to be tested to determine whether this finding is relevant for all groups.

Although other studies have successfully manipulated the permeability of boundaries (often by telling participants explicitly that boundaries were weak or strong), this was not the case in this study. We still need to determine exactly what it means to have strong boundaries in an online group. To understand causal relationships, experimental manipulation is the gold standard (Antonakis, Bendahan, Jacquart, & Lalive, 2010). Thus, researchers should continue to try to find ways to experimentally manipulate the boundaries of online groups to determine which cues are salient enough to change observers' perceptions.

Lastly, the nomological network surrounding entitativity should continue to be examined. Though relationships have been well-established for some antecedents, the explanatory mechanisms by which they lead to entitativity are not fully understood. Another fruitful area of study is to continue investigating the outcomes of entitativity and

copresence. Important group outcomes such as participation, identification, and cohesiveness are some that need further attention. Once again, some of these outcomes are understood in FtF contexts, but need additional consideration in online groups.

A final takeaway from this research is the importance of measuring participants' perceptions of experimental materials, especially if any form of deception is involved. In this study, the two items measuring whether participants believed the sports forum was realistic and truly existed were strongly correlated with all study variables. Though these items were originally included as an attention check, those who believed the experimental materials were realistic had higher perceptions of boundaries, copresence, and entitativity, in addition to the other entitativity antecedents.

In order to draw conclusions about the real world, we must consider perceptions of those who believe they are observing a real group (as they would in a natural setting.) In future experimental studies, particularly online studies where the researcher has less control over the participants' environment, it is critical to measure perceptions of believability of materials and either control for this or exclude participants entirely.

Though theories about interacting groups have existed for decades, it has become clear that prior knowledge may not directly apply to online groups. The qualities of group members, such as similarity and common goals, may be similarly represented online, but qualities of the group environment, such as boundaries, may not. The ideal way to test causal relationships is to use experiments, but the experiment is only effective if the manipulation of key variables is successful. Conducting studies of online groups can sometimes be more feasible than FtF groups, so there is certainly room to continue research in this domain. This study provides a first step toward understanding

individuals' perceptions of online groups, but there is much to be learned about how copresence, entitativity, and group outcomes operate in an online setting.

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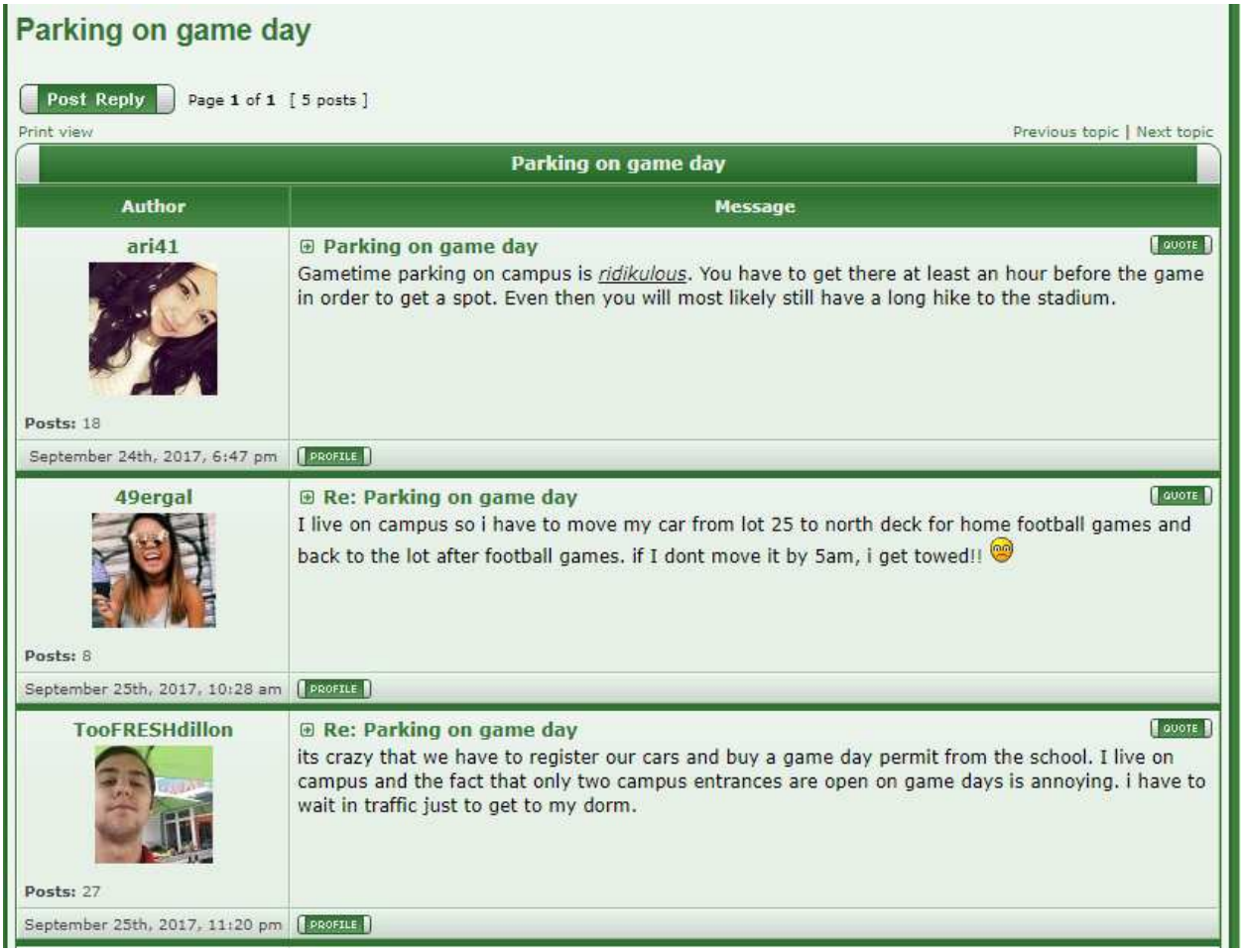
APPENDIX A: SNAPSHOT OF EXPERIMENTAL FORUM



Parking on game day

Post Reply Page 1 of 1 [5 posts]

Print view Previous topic | Next topic

Parking on game day

Author	Message
ari41 Posts: 18	Parking on game day QUOTE Gametime parking on campus is *ridikulous*. You have to get there at least an hour before the game in order to get a spot. Even then you will most likely still have a long hike to the stadium.
September 24th, 2017, 6:47 pm	PROFILE
49ergal Posts: 8	Re: Parking on game day QUOTE I live on campus so i have to move my car from lot 25 to north deck for home football games and back to the lot after football games. if I dont move it by 5am, i get towed!!
September 25th, 2017, 10:28 am	PROFILE
TooFRESHdillon Posts: 27	Re: Parking on game day QUOTE its crazy that we have to register our cars and buy a game day permit from the school. I live on campus and the fact that only two campus entrances are open on game days is annoying. i have to wait in traffic just to get to my dorm.
September 25th, 2017, 11:20 pm	PROFILE

APPENDIX B: COPRESENCE MEASURE

Original Item	**Revised Item**
I noticed (the sports forum users)	Same
(The sports forum users) noticed me	(The sports forum users) will notice me
(The sports forum users') presence was obvious to me	Same
My presence was obvious to (the sports forum users)	My presence will be obvious to (the sports forum users)
(The sports forum users) caught my attention	Same
I caught (the sports forum users') attention	I will catch (the sports forum users') attention

Note: The wording of some items was changed slightly to reflect the fact that participants are not having a live conversation with the forum users, but instead posting a message that will be viewed once it is "approved" by the forum's administrator

TABLE 1: Descriptive statistics for study variables

Descriptive Statistics for Study Variables

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Weak Boundaries	5.13	1.02	-											
2. Strong Boundaries	3.74	1.23	-.11[a]	-										
3. CP – I notice them	4.60	1.34	.34[b]	-.06	-									
4. CP – They notice me	4.29	1.29	.27[b]	-.03	.74[b]	-								
5. Copresence*	4.44	1.23	.32[b]	-.05	.93[b]	.93[b]	-							
6. Entitativity	4.74	1.10	.41[b]	.23[b]	.38[b]	.28[b]	.35[b]	-						
7. Interactivity	4.90	0.98	.49[b]	.12[a]	.34[b]	.25[b]	.31[b]	.48[b]	-					
8. History	4.49	0.99	.33[b]	.29[b]	.18[b]	.17[b]	.19[b]	.48[b]	.59[b]	-				
9. Similarity	4.83	0.96	.39[b]	.08	.26[b]	.20[b]	.25[b]	.57[b]	.36[b]	.31[b]	-			
10. Common Goals	5.11	0.97	.53[b]	-.01	.32[b]	.26[b]	.31[b]	.52[b]	.49[b]	.33[b]	.66[b]	-		
11. Homogeneity*	4.98	0.87	.50[b]	.03	.32[b]	.26[b]	.31[b]	.60[b]	.46[b]	.34[b]	.91[b]	.91[b]	-	
12. Sports Interest	5.49	1.66	.04	.03	.13[b]	.12[a]	.13[a]	.07	.06	.13[a]	.16[b]	.05	.12[a]	-
13. Computer Experience	5.28	1.50	.22[b]	-.08	.17[b]	.16[b]	.18[b]	.07	.20[b]	.11[a]	.14[a]	.10[a]	.12[a]	.08

* Denotes second-order factor. CP = Copresence. *Copresence* is a second order factor comprised of *CP – I notice them* and *CP – They notice me. Homogeneity* is a second-order factor comprised of *Similarity* and *Common Goals.*

[a] Correlation is significant at the 0.05 level (2-tailed).

[b] Correlation is significant at the 0.01 level (2-tailed).

N = 348

TABLE 2: T-tests for study variables by control group and experimental group

T-Tests for Study Variables by Control Group and Experimental Group

	Condition				
	Control *M (SD)*	Experimental *M (SD)*	*t*	df	*p*
1. Weak Boundaries	5.18 (0.99)	5.11 (1.04)	.61	216	.54
2. Strong Boundaries	3.70 (1.24)	3.75 (1.23)	-.40	209	.69
3. CP – I notice them	4.52 (1.35)	4.64 (1.33)	-.74	206	.45
4. CP – They notice me	4.24 (1.30)	4.31 (1.29)	-.49	206	.62
5. Copresence	4.38 (1.24)	4.47 (1.22)	-.66	206	.51
6. Entitativity	4.75 (1.04)	4.73 (1.13)	.11	225	.91
7. Interactivity	4.82 (0.96)	4.94 (1.00)	-1.10	215	.27
8. History	4.40 (0.92)	4.52 (1.02)	-1.09	226	.27
9. Similarity	4.90 (0.87)	4.81 (0.99)	.86	232	.39
10. Common Goals	5.14 (0.90)	5.09 (1.00)	.49	234	.62
11. Homogeneity	5.02 (0.77)	4.96 (0.92)	1.73	127	.08

CP = Copresence.

TABLE 3: Multiple group analysis for model with study variables only

Multiple Group Analysis for Model with Study Variables Only

Model	AIC	BIC	X^2 (df)	ΔX^2	CFI	Δ CFI
1. Configural Invariance (Structure)	14335	14735	168.53 (104)	-	.958	-
2. Metric/Weak Invariance (Loadings)	14329	14676	190.79 (118)	22.26	.953	.005
3. Scalar Invariance (Intercepts)	14335	14662	206.74 (123)	15.95*	.946	.007
4. Invariance of Factor Means	14322	14619	210.18 (131)	3.45	.949	.003

* $p < .01$

AIC = Akaike information criterion. BIC = Bayesian information criterion.

FIGURE 1: Hypothesized model

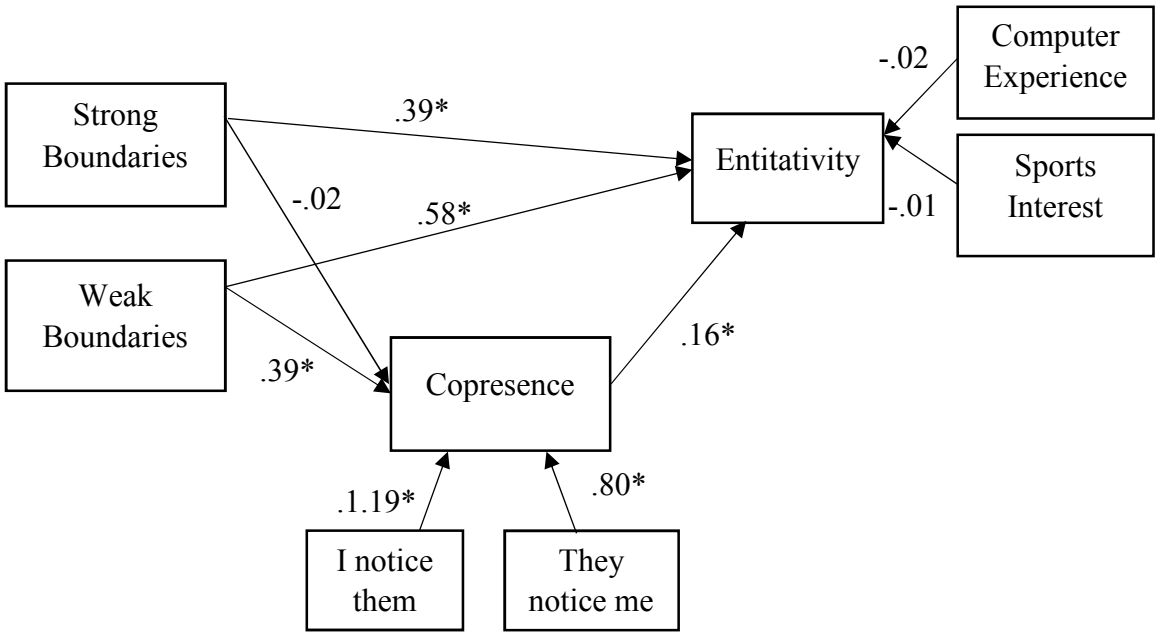


Figure 1. Hypothesized model.

* $p < .001$

$N = 348$

FIGURE 2: Hypothesized model with additional entitativity antecedents

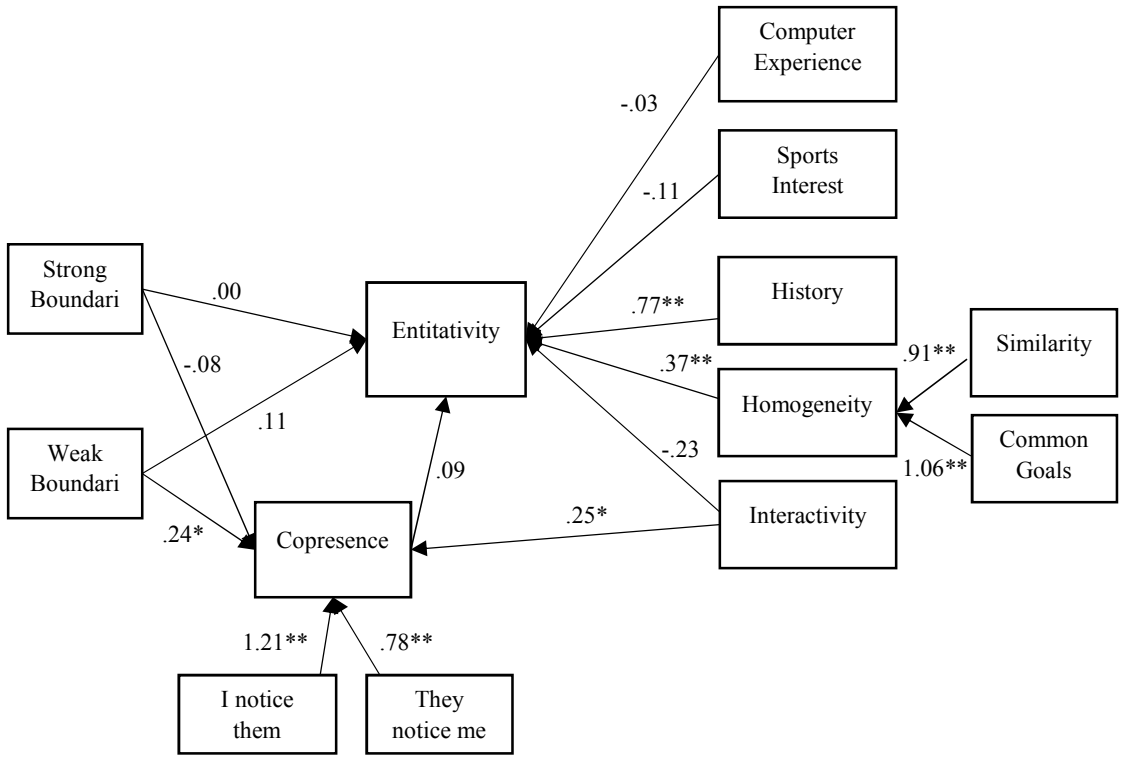


Figure 2. Hypothesized model with additional entitativity antecedents.

* $p < .01$

** $p < .001$

$N = 348$