

## AN ABSTRACT OF THE THESIS OF

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Abstract approved:

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The purpose of this thesis was to assess the relationship between group rapport and nonverbal expressivity using three data sources: self-report, observer ratings, and test data. Assessing these constructs using multiple data sources enabled the construction of multitrait-multimethod matrices. These matrices allowed for a critical evaluation of the convergent and discriminant validity of the group rapport and nonverbal expressivity constructs. Participants ( $N = 162$ ) were randomly assigned to small groups of 5-7 (24 groups total) and tasked with completing a puzzle activity in collaboration with their group members. Rapport has been colloquially defined as the “clicking, chemistry, and harmony” shared between interactants. After the activity, participants rated their rapport experience. Groups were filmed while completing the activity and objective raters assessed the groups on domains derived from the rapport (Tickle-Degnen & Rosenthal, 1987) and entitativity (Campbell, 1958) literatures. Group rapport has been theorized to be relevant for successful group collaboration in many applied contexts (e.g., business, health care, and

engineering), therefore the primary outcome (test) measure of group rapport was whether groups successfully completed the puzzle activity before the other groups assigned to complete the same puzzle. It was expected that nonverbal expressivity (defined as the extent to which an individual uses their face, gestures, body, and voice to transmit emotion) would be associated with group rapport because expressive individuals are easier to accurately read and respond to compared to their unexpressive counterparts. Nonverbal expressivity had a weak relationship with group rapport, indicating that nonverbal expressivity may not be as important for effective group collaboration as it is for dyadic exchanges. In addition to the self-reports, observer ratings of group rapport and entitativity based on only ten-second segments (thin slices) of group behavior were associated with whether groups won the puzzle competition. Based on these findings, a development to group rapport theory is proposed that includes entitativity as a primary component of rapport in small groups. It is recommended that future investigations empirically test this supposition in addition to evaluating the utility of short segments of behavior (thin slices) to predict applied group outcomes.

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Group Rapport and Nonverbal Expressivity

by  
Amber A. Fultz

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Master of Science thesis of Amber A. Fultz presented on May 28, 2020

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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Amber A. Fultz, Author

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## DEDICATION

This thesis is dedicated to the memory of my granny, Ardena Fultz,  
who was not afraid of hard work.

## Group Rapport and Nonverbal Expressivity

Groups are a ubiquitous part of our social lives (Forsyth, 2014). Our social identity is largely determined by group membership (Hogg et al., 2017). This has implications for the formation of our self-construct (Sedikides & Gregg, 2003), as well as our experience of social support (Jetten et al., 2017). Although groups are integral to our social worlds, they do not receive the same rigorous amount of attention in psychological science as other social processes. This is because groups are difficult to study and come with theoretical baggage (Forsyth, 2019).

The primary area of focus for this thesis is *intragroup* processes (Brown & Pehrson, 2019). *Intragroup processes* refer to systems of psychological phenomenon that occur within a group. Chizhik and colleagues (2009) identified *cooperation* as one of the primary components of intragroup processes. Many professional environments require groups to collaborate. For example, studies examining the collaborative success of groups can be found in business (Riggio, 2013), health care (Pullon, 2008), engineering (Liu et al., 2011), and politics (Huddy, 2015). Ideally, the groups formed in these environments would have some degree of interpersonal success and rapport. Rapport is related to cooperation in the way that groups who establish some rapport may find it easier to effectively reach shared goals (e.g., Drolet & Morris, 2000).

To “build” rapport is thought to be equivalent to achieving the highest state of interpersonal success in some of contexts (Tickle-Degnen &

Rosenthal, 1990). For example, training in many domains of clinical psychology emphasizes the importance of therapists and clinicians developing rapport with their clients (e.g., Leach, 2005). Doctors that build rapport with their patients have been reported to be more effective in their health care efforts (Norfolk et al., 2007). Finally, in the teaching and learning literature rapport is a primary predictor of student success (Wilson et al., 2010; Demir et al., 2019).

There are a few notable recommendations in the literature for how to measure rapport in groups (e.g., Tickle-Degnen & Rosenthal, 1987). There are also some intragroup constructs that theoretically come very close to rapport (i.e., *entitativity* and *deindividuation*). The application and measurement of these constructs largely depend on what exactly one considers to be a “group.”

### **Psychology of Groups**

The multitude of definitions available for the social psychological construct of the *group* indicates that groups are social artifacts that exist intuitively (i.e., all would acknowledge they are members of specific groups) - but identifying what exactly makes a *group* rather than a collection of individuals is up for debate. In fact, Allport (1924) was one of the first to argue that groups are primarily sets of *individuals* that share psychological motivations and perspectives (e.g., values, ideas, etc.). This emphasis on the individual is important to note because it implies that all behavior is attributed to the individual rather than the unique identity of the group. This perspective

also implies that “groups” are not real per se, instead they are a result of an individual’s perception of *belonging* to a collective.

Other definitions of a “group” come closer to conceptualizing groups as entities that have unique psychological processes that are not observable in any one individual. Shaw (1981) proposed a definition of the group that captures the interpersonal processes underlying motivation, goal-seeking, and life-outcomes. He defined groups as “two or more persons who are interacting with one another in such a manner that each person influences and is influenced by each other person.” Bass (1960) proposed a motivational perspective. Groups are a collection of individuals whose existence is rewarding to the individuals, which prompts membership. This is closely related to the *goals* perspective, which defines a group as individuals who share the same goals (Mills, 1967).

In direct opposition to Allport’s (1924) definition, there are those (Warriner, 1956) who have argued groups have unique psychological processes that are impossible to observe at the individual level. In other words, group psychology is distinct from individual psychology. In fact, it would be inaccurate to assume that individual psychology extends to groups because of the unique characteristics of groups. Bales (1950) provided a method for studying small groups that required outside observers to assess the group interaction. This is because the unique group-level characteristics that are displayed by group members during an interaction are more effectively assessed using objective observers as opposed to participant reports. One



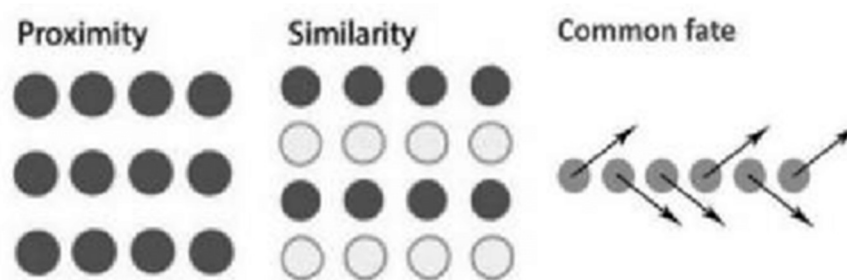
perceptual assessment that can be made by an outside observer is referred to as group *entitativity*.

### Group Entitativity

Entitativity refers to the perceived unity of a group (Campbell, 1958). It is a construct that varies in magnitude or intensity – that is, entitativity is essentially the degree of *realness* of a group. It is the scale that separates a group from a cluster of individuals. Determining the shared entitativity of a group is classically dependent on the gestalt principles of proximity, similarity, and common fate (Koffka, 1999). Proximity in this context is the extent to which individuals are physically close to one another. Similarity is the extent to which group members appear to be physically similar to one another. Finally, common fate is the extent to which group members appear to move mutually in a singular direction (i.e., have a shared trajectory). Figure 1 displays these principles.

**Figure 1**

Gestalt Principles of Proximity, Similarity, and Common Fate.



An example of a group that would likely score high on entitativity is a basketball team. Basketball teams often display high proximity – they will convene in their group to discuss strategy or plan for the rest of the game.

They also share physical attributes – teammates are generally wearing the same uniform from head to toe (which has been shown to increase perceptions of similarity, Callahan & Ledgerwood, 2016). Finally, basketball teams tend to display common fate – they move in sync and typically in the same direction (e.g., toward a specific hoop to defend or score). Combined, these principles guide perceptions of entitativity by outside observers.

### **Deindividuation**

One unexpectedly relevant phenomenon that has been used to explain an individual's behavior that provides important insights for understanding intragroup processes and rapport is *deindividuation* (Diener, 1979).

Deindividuation is traditionally defined as reduced self-awareness and deregulated behavior caused by being in a group or crowd. This phenomenon is typically associated with anti-normative, aggressive behavioral outcomes (Postmes & Spears, 1998). Some would consider the word *deindividuation* to be synonymous with antisocial behavior, however the empirical support for this is inconsistent (Spears, 2017). Because of this, researchers have proposed a revision to deindividuation theory.

This revision is the social identity model of deindividuation (Spears, 2017; Vilanova et al., 2017). This model essentially outlines the antecedents where deindividuation is most likely to occur; namely, that anonymity changes *with* the relative saliency of personal vs. social identity. This is separate from classical deindividuation models because it centers social identity as the precursor for deindividuation. Specifically, that deindividuation

is when an individual perceives themselves in terms of the groups to which they belong (Vilanova et al., 2017).

For example, if an individual strongly identifies with their religious organization, their behavior at a specific religious event (e.g., Sunday service) will adhere closely to the norms of the group. In this scenario, perhaps the individual would donate more of their income during the service or be more likely to volunteer for a specialized role within the organization. In contrast, perhaps a teen who strongly identifies with a group of friends that are more likely to instigate deregulated behavior as defined by Diener (1979; e.g., pushing over garbage cans) and will adhere to those group norms.

Importantly, these examples illustrate that the social identity model of deindividuation does not imply that deindividuation always results in antisocial behavior. Behavior is simply a result of the norms and values of the deindividuated group (Reicher et al., 2016).

There is one notable scale that was created to assess the extent to which individuals experienced deindividuation during an experimental activity (Prentice-Dunn & Rogers, 1980; 1982). It consists of 17 items, including, “There was a feeling of togetherness among group members,” and “I felt self-conscious (Reversed)”. Higher scores on this scale was associated with deindividuated behavior in an experimental paradigm (Prentice-Dunn & Rogers, 1980; 1981). Notably, although the scale items were designed to assess deindividuation they include content (e.g., “togetherness”) that is also associated with the entitativity construct as defined by Campbell (1958).

## Rapport

Rapport may be colloquially defined as the clicking, chemistry, or harmony experienced by human beings within an interaction (Bernieri, 2005). People may know what one means when they say “rapport,” but the vagueness of the construct makes it difficult to define what it is in a scientific context. For example, in a study assessing teacher-student rapport Frisby and Martin (2010) defined rapport as “an overall feeling between two people encompassing a mutual, trusting, and prosocial bond.” Is it the degree of a “bond” between individuals, or something that transcends that simplistic connotation? Tickle-Degnen and Rosenthal (1987, 1990) emphasized in their writings that “working definitions [of rapport] neglect the richness of implications of the term *rapport*” (italics in original).

There are not many published rapport theories. There are two operationalizations of what some would call “interpersonal success” that potentially capture the complexity of the rapport construct. Although researchers using these measures never refer to them as assessing “rapport” per se, they provide some insight on rapport theory. One is the Noller (1980) research program which defines interpersonal success as “dyadic adjustment” within a relationship. The other is derived from the entitativity literature. Lickel and colleagues (2000) define cohesion as the *appearance* of “groupiness” to an outside observer.

In contrast to these two broad generalizations of “interpersonal success,” Tickle-Degnen and Rosenthal (1987; 1990) proposed a theory of

rapport that provides evidence for the specific components of rapport (and was originally proposed for groups in particular). These three perspectives are described below. Notably, these perspectives will be independently operationalized and assessed in the present investigation.

### *Noller*

Noller (1980, 2001) conducted several studies on the factors that contribute to marital satisfaction. The scale originally used to measure “marital satisfaction” was the Dyadic Adjustment Scale (DAS; Spanier, 1976) that was created to assess broad “dyadic adjustment” not necessarily unique to married couples (i.e., the scale can be administered to unmarried couples). Interestingly, two subscales of the DAS include a) dyadic satisfaction and b) dyadic cohesion. Theoretically, this is quite consistent with the components of rapport proposed by Tickle-Degnen and Rosenthal (1987; 1990, discussed below). This is the justification for including a discussion of Noller’s work in a summary of rapport theories, even if the focus is on marital satisfaction.

Noller recruited married couples to engage in a standard content communication task (Noller, 2001). In this task, participants would be given a specific scene with an ambiguous statement to communicate (e.g., You and your partner are sitting alone on a winter evening. You feel cold. You say, “I’m cold, aren’t you?”). They would be assigned to communicate the statement in either a positive (You want your partner to warm you with physical affection), negative (You feel that they are inconsiderate in not having turned up the heat by now, and you want them to turn it up straight

away), or neutral (You wonder if it's only you who are cold, or if they are cold, too) manner. The spouse was tasked with accurately identifying the communicative intent of the message the speaker was assigned. This paradigm allowed both encoding (communication) and decoding (accuracy) scores to be calculated for all participants.

Noller (1980) found that couples who were more satisfied (i.e., scored higher on the DAS) in their relationships were also more effective at encoding and decoding each other's emotional messages. Interestingly, couples who were less satisfied in their relationships were also less successful at decoding each other's messages than random individuals who viewed and judged their communications! This indicates that "dyadic adjustment" (potentially rapport) is empirically associated with effective communication between individuals. Given this, effective communication could be a correlate of true rapport.

Follow up investigations replicated this satisfaction-communication effectiveness link. For example, Carton and colleagues (1999) found that the ability to decode facial expressions and tone-of-voice was associated with heightened self-reported relationship satisfaction and lower rates of depression. Duck (1994) theorized that relationship satisfaction requires continuous communicative maintenance because satisfaction is a spectrum of interaction quality that is constantly variable. Notably, this is exactly the theoretical perspective Spanier (1976) used when constructing the DAS scale.

*Lickel*

Lickel and colleagues' (2000) assessment of "groupiness" comes from the traditional perspective on *entitativity* proposed by Campbell (1958). Again, this is not "rapport", but has some overlap with the rapport literature. Lickel and colleagues' (2000) research program has generally reported that groups who seem to have common goals, outcomes, and similar appearances tend to be perceived as more "groupy" by outside observers. Groups rated high in entitativity were also the ones that outsiders most desired to be a part of. Future investigations by Crump and colleagues (2011) made a distinction between perceptions of entitativity and similarity. They claimed the constructs of entitativity and similarity were distinct – although highly correlated. This implies that group members do not necessarily need to be homogenous in appearance in order to be perceived as entitative.

Lakens (2010) investigated whether movement synchrony was associated with entitativity. In a series of studies, Lakens found that stick figures waving in sync were perceived as more entitative than those that were out of sync. These findings were also extended to when human beings were videotaped waving in sync and out of sync. This indicates that artificially manipulated synchrony is associated with group entitativity in addition to perceived similarity and common goals. This is important because synchrony (shared movement, or common fate) has long been connected to rapport (Bernieri, 1988; Bernieri et al., 1994; Tickle-Degnen, 2006, Lakens & Stel, 2011; Vacharkulksemsuk & Fredrickson, 2012). This illustrates that

measuring entitativity using observer reports could be a way to assess certain aspects of the rapport construct.

### ***Tickle-Degnen & Rosenthal***

Tickle-Degnen and Rosenthal (1987; 1990) proposed a theory specific to rapport. It operationalizes the construct as consisting of three essential components. These components are mutual attention, positivity, and nonverbal coordination.

Mutual attention refers to when attentional focus is directed outward toward the interaction partner(s) as opposed to inward (e.g., toward the self). This focus is described as an “intense mutual interest in what the other is saying or doing”. Positivity is defined as mutual friendliness and caring. This includes the affective definition of positivity, which is generalized enjoyment during the interaction. The final component of rapport is nonverbal coordination. Tickle-Degnen and Rosenthal (1990) define coordination as moments where “participants are ‘with’ one another, functioning as a coordinated unit, such as postural mirroring and interactional synchrony”. This definition emphasizes the observable nonverbal behavior corresponding to rapport in an interaction, which has been reported in other investigations (Bernieri et al., 1994; Tickle-Degnen, 2006).

It is important to note that all three components of rapport must be present to some degree to experience rapport. The relative importance of each component changes as the relationship develops (see Tickle-Degnen &



Rosenthal, 1990). This theory of rapport is unique because nonverbal behavior is the theoretical focus. It is also the nonverbal cues corresponding to these components that are assessed in practice. In comparison, Lickel's (2000) research program focuses on the measurement of group entitativity and Noller (1980) the assessment of communication effectiveness. The present study will incorporate measures of all three approaches in order to assess the interrelationships between them.

### **Summary**

Group processes relevant to the present study are entitativity, deindividuation, and rapport. There is theoretical overlap between these processes. For example, both entitativity and rapport emphasize the importance of shared, simultaneous movements. This is referred to as "common fate" in the entitativity literature (Campbell, 1958) and "coordination" in the rapport literature (Tickle-Degnen and Rosenthal, 1990). Similarly, an important feature of deindividuation is state of "reduced self-awareness". Theoretically, this results in total attention being allocated to group members. In Tickle-Degnen and Rosenthal's (1987; 1990) theory of group rapport, mutual attention is also one the defining features of the rapport experience. These processes are not theoretically equivalent (e.g., entitativity is a perceptual judgement whereas rapport is the experience of the interactants) but the behavior resulting from these processes may very well be driven by core, shared psychological experiences among group members.

### **Nonverbal Expressivity and Rapport**

In Noller's (1980) work, communication effectiveness was associated with relationship satisfaction. This lends credibility to the expectation that the ability to effectively communicate one's emotions to others contributes to rapport. Other investigations have corroborated this expectation. Bernieri and colleagues (1996) showed gestures and animated movements (i.e., communication effectiveness) to be associated with rapport (as reported by participants) *and* with perceptions of rapport made by outside observers. In the nonverbal behavior literature, this "communication effectiveness" is specifically referred to as "expressivity."

Technically, *expressivity* refers to the extent to which individuals use facial expressions, voice, gestures, and body movements to transmit emotion (Friedman et al., 1980). Of course, "the ability to transmit emotions" is a broad statement. This could refer to acting ability (Noller, 2001), general charisma (Friedman et al., 1980), or even the intensity of spontaneous expressions (e.g., Nowicki & Duke, 1994). Below, specific operationalizations of expressivity are described. In all cases, expressivity is assumed to be an individual difference (i.e. individuals vary in the extent to which they utilize these nonverbal behaviors to communicate their emotions to others).<sup>1</sup>

Supporting the reports by Noller (1980) and Bernieri and colleagues (1996), Tickle-Degnen (2006) published an elaboration on the original rapport theory (Tickle-Degnen & Rosenthal, 1990) where she argued that that

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<sup>1</sup> Of course, individual differences in expressivity may not be always be attributable to a trait-level characteristic. Some individuals have disabilities that prevent them from physically expressing emotions through specific nonverbal channels (face, body, and voice) or that result in difficulties regulating emotional responses.

expressivity should theoretically be a primary predictor of rapport. The specific mechanism for this expectation is essentially that the *ease* with which people identify the emotions of conversational partners facilitates rapport-building.

### **Tickle-Degnen (2006)**

Expressive individuals are perceived more accurately (Ambady et al., 1995; Colvin, 1993; DePaulo et al., 1992; Funder, 1995) than those who are less expressive. This can be important for relationship development. Nonverbal expressivity essentially acts as an invitation for others to know the feelings, intentions, and attitudes of a conversational partner (Boone & Buck, 2003). Tickle-Degnen (2006) elaborated on this by emphasizing that the perceiver of the nonverbally expressive individual has more of an opportunity to evaluate whether an interaction with that person will be “psychologically fulfilling” (i.e., rapport-filled). Tickle-Degnen (2006) referred to these types of interpersonal exchanges as ones characterized by “optimal rapport” because interactants are accurately communicating and interpreting the specific communications between one another in addition to experiencing mutual attention, positivity, and nonverbal coordination.

In the first test of Tickle-Degnen’s (2006) “optimal rapport”, Nelson and colleagues (2016) found that nonverbal expressivity predicted dyadic rapport ( $r(50) = .46, p = .001$ ). In this case, nonverbal expressivity was measured using observer reports (i.e., trained research assistants who rated expressivity on a 1-7 scale). Rapport was measured by requiring each

participant to complete the 18-item rapport scale (Bernieri et al., 1994) and averaging the total rapport score across each dyad. Vicaria (2018) also found evidence for an expressivity-rapport relationship. In her study, expressivity predicted rapport in young-adult dyads. These findings illustrate that nonverbal expressivity has the potential to be extremely important for the formation and maintenance of rapport in relationships.

### **Methodological Assessment of Expressivity: Sources of Data**

As mentioned above, expressivity is defined as “the extent to which individuals use facial expressions, voice, gestures, and body movements to transmit emotion” (Friedman et al., 1980). This is a broad definition, so researchers have assessed expressivity using the three classic data sources (Funder, 2015): self-report, observer report, and test data.

#### ***Self-Report***

One self-report measure of expressivity was created by Friedman and colleagues (1980). This measure is referred to as the “Affective Communication Test” or ACT. The ACT is a 13-item measure where respondents endorse items such as, “I show I like someone by hugging or touching that person,” and “I like to remain unnoticed in a crowd” (Reversed) using a 9-point scale ranging from -4 to +4. It was specifically designed to measure individual differences in expressivity (discussed as charisma). It correlates with other measures of expressivity such as the Exhibition subscale from the Jackson PRF (Jackson, 1974). The ACT predicts ratings of expressiveness made by friends, a history of running for political office or

public lecturing, and theatrical experience (Friedman et al., 1980). Later studies utilizing the ACT revealed that it also predicts likability – specifically, that nonverbally expressive people are perceived as more likable (Friedman et al., 1988; Stosic et al., 2019).

### ***Observer Ratings***

Another approach to measuring nonverbal expressivity is to have outside observers make independent ratings on either live behavior or clips of behavior. This technique has been employed for many decades (Zuckerman et al., 1975; Noller, 1980, 2001). The benefit of using observer reports is that people may not have direct access to and accurate recall of their nonverbal behavior (e.g., Nisbett & Wilson, 1977). While the ACT requires respondents to reflect on their past behaviors and rate the consistency with which they enact those behaviors, observer ratings allow researchers to directly assess those expressive behaviors in real time.

### ***Test Data***

A final approach to measure nonverbal expressivity is to assess participants' ability to communicate emotion by having them engage in an encoding activity (acting task). This is precisely what Noller (1980, 2001) did. Participants were given specific phrases to communicate in either a positive, negative, or neutral way. Their encoding (or expressivity) scores were the proportion of judges who accurately identified the emotional valence they were assigned. As mentioned above, this technique is specifically referred to as a “standard content” task. It is worth noting that this type of task confounds

decoding and encoding skill such that it is impossible to assess an actor's encoding ability without including variance from perceivers' decoding ability.

### **The Present Study**

The present investigation includes an empirical examination of group rapport and nonverbal expressivity. The primary purpose of this thesis is to attempt to integrate the literatures (entitativity, deindividuation, and rapport) discussed above theoretically and empirically by assessing group rapport employing methods and measures derived from these literatures. In contrast to common self-report studies of rapport, this investigation will include observer ratings and performance test data relevant to rapport to complement the self-reports from participants. A secondary purpose of this thesis will be to examine, extend, and test the proposed theoretical link between nonverbal expressivity and rapport within a small group paradigm.

### **Three Hypotheses**

H1) Measures of entitativity and deindividuation will be correlated with measures of rapport because entitativity and rapport share a *common fate* (simultaneous movement) principle and deindividuation and rapport share a *reduced self-awareness* (mutual attention) principle.

H2) The three sources of data (self-report, observer report, and test data) will converge to validate the group rapport and expressivity constructs.

H3) Nonverbal expressivity will predict rapport because the perceiver of the nonverbally expressive individual has more of an opportunity to evaluate

whether an interaction with that person will be psychologically fulfilling (i.e., rapport-filled).

To test these hypotheses, groups of 5-7 participants were assessed during their enrollment in a ten-week long research practicum. During that time, groups completed ten getting-to-know-you activities ranging from eating a meal together to cleaning something together. In this thesis, the focus of analysis is a specific activity that allows for objective assessment of cooperative group performance: completing a group task faster than competitors. In this competition, groups were given a jigsaw puzzle and attempted to complete it faster than their opponents (other groups enrolled in the practicum). This is a primary outcome of interest because it provides a specific operationalization of successful intragroup collaboration (Chizhik et al., 2009).

### **Method**

The data used for this investigation come from a much larger study designed to create a nomological network of interpersonal sensitivity (Brown & Bernieri, 2017; Fultz & Bernieri, 2018). Participants were 182 undergraduate students (arranged in 27 groups) enrolled in a research practicum at Oregon State University. This practicum took place nine times over the course of 5 years (such that 15-21 participants were ran at one time). Each research practicum was 10 weeks long. Of the 182 participants, 69 were males and 113 were females. Participant ages ranged from 18 to 54 years ( $M = 22.1$ ,  $SD = 4.79$ ) and 93% of them identified English as their first language.

A total of 144 participants were Caucasian (79%), 3 were African American (2%), 11 were Hispanic (6%), 8 were Asian/Pacific Islander (4%), 6 were American Indian/Alaskan Native (3%), and 10 selected other (6%). There were 22 freshman (12%), 25 sophomores (14%), 53 juniors (29%), 73 seniors (40%), and 9 that selected other (5%). Three groups did not participate in the puzzle task, therefore data from 24 groups ( $N = 162$ ) were usable for all analyses. The demographic makeup of these 24 groups did not substantially differ from the entire sample. Participants were treated in accordance with the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association, 2017) and all gave informed consent.

Participants were arranged in groups of 5-7 on day one of the practicum. Groups met three times a week under the supervision of the lead course assistant. Groups also met outside of the practicum once a week to engage in a lab activity that was not supervised by the research team. There were 6-8 lab activities over the course of the 10 weeks. These activities were designed to allow participants to engage in real-life settings beyond the laboratory without the risk of demand characteristics (e.g., Nichols & Maner, 2008) that would arise from the presence of experimenters. The activities included tasks such as eating a meal with one another (e.g., Figure 2), traveling together, and playing a game together.

## **Figure 2**

*Google Stock Photo of a Group Meal.*





Over the course of the practicum, participants also completed a battery of personality assessments and psychosocial activities. Relevant to the present discussion are measures of expressivity and activities involving group communication (described below). Thus, the practicum was long enough to allow for the formation and maintenance of groups and for participants to be assessed across a variety of psychological domains.

### **Expressivity of Each Group Member**

Individual differences in expressivity were assessed by collecting self-report, observer ratings, and test data.

#### ***Self-Report Expressivity (Trait Expressivity)***

The ACT (Friedman et al., 1980) to measured trait expressivity. The reported reliability for this self-report was a Cronbach's alpha of .77. In this sample of  $N = 162$ , Cronbach's alpha was .81<sup>2</sup>. Because this is an individual

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<sup>2</sup> In the full sample of  $N = 182$ , the Cronbach's alpha was also .81.

difference measure, participants completed this scale independent of their group members.

### ***Observer Ratings of Expressivity***

Participants were individually filmed during an acting task designed to assess their communication ability and modeled directly after Noller's (1980; 2001) standard content communication task (described in detail below). Each clip was approximately 5 seconds long. These clips were compiled to create an entire rating set. This set was shown to research assistants who rated the expressivity of each participant.

A total of 26 research assistants were originally tasked with making these ratings. They were instructed to make two sets of ratings. In the *video* expressivity ratings, the raters watched the clips without sound and rated two items (face and body expressivity) on a 1-7 scale where '1' was anchored with "not at all expressive" and '7' with "very expressive." For the *audio* expressivity ratings, the raters listened to the clips with no visual accompaniment. They rated three items: speech rate, vocal projection, and overall vocal expressivity on a 1-7 scale. The anchors for the audio expressivity ratings were the same (not at all expressive, very expressive).

Because some research assistants did not complete the ratings, face and body expressivity were ultimately rated by 19 research assistants while rate of speech, vocal projection, and overall vocal expressivity were rated by 11 research assistants. The interrater reliability for these constructs was

estimated using an intraclass  $r$ . The effective reliabilities given the intraclass  $r$ 's and the corresponding number of raters (calculated using the Spearman-Brown formula, Rosenthal & Rosnow, 2008) ranged from  $R_{sb} = .90$  to  $.97$ .

### ***Expressivity Test (Acting Task)***

The acting task was a variation of Noller's (2001) standard content test. It was developed and validated by Raymond (2016). Participants were given nine statements to communicate in a positive, negative, and neutral way to their group (for a total of 27 statements, 9 statements x 3 emotional intents = 27). Figure 3 displays the set-up for this activity.

**Figure 3**

#### *Acting Task Configuration*



The full list of statements and their possible interpretations is provided in Appendix A. The order these statements were delivered was counterbalanced.

Encoding scores are calculated based on the number of group members who accurately decode each message. For example, if 5/6 judges accurately identify the emotional intent of a single message, the encoder would receive a score of .83 (5/6) for that round.

In a group of 7, the maximum encoding score a participant could earn was 162/162 (the six group members would decode a total of 27 statements,  $27 \times 6 = 162$ ). Since chance accuracy is approximately 33%, the minimum encoding score a participant could earn was about 54/162 (33%).

### **Group Rapport**

Group rapport was assessed using three methods: self-report, observer report, and test data. Self-reports were completed after each group activity (including the puzzle competition). Groups were filmed during the puzzle competition, and these clips served as stimuli for the observer ratings of rapport. Outside research assistants rated these clips for several aspects of rapport (also described below). Finally, the test data for group rapport was collected by identifying the groups who won and lost the puzzle competition.

### ***Self-Reports of Group Rapport***

Over the course of the research practicum, groups were assigned to participate in as many as 10 activities. These activities are listed in Appendix B. They fell into two categories: supervised experimental tasks (e.g., Figure 3) and unsupervised lab activities (e.g. Figure 2). After each activity, group members completed both an activity impression questionnaire and a variation of Prentice-Dunn and Roger's (1980) deindividuation scale.

The activity impression questionnaire consists of items that were designed to be extremely face-valid. Two specific items are most relevant to the present investigation. Participants rated the extent to which they felt *connected* to their group on a 1-7 scale during the task. They also rated how quickly time passed during the activity on a 1-5 scale. The entire questionnaire is displayed in Figure 4.

**Figure 4**

*Activity Impression Questionnaire*

How connected do you feel to Green Group?									
Not at all connected	1	2	3	4	5	6	7	Very connected	
How quickly did time seem to pass?									
Very Quickly	Quickly	No faster/slower than Normal	Slowly	Very Slowly					

The next few questions pertain to putting the puzzle together.

Your level of contribution to the assembling of the puzzle:

*I did not contribute at all*    1   2   3   4   5   6   7    *I contributed more than anyone else*

Who contributed the most to the puzzle assembly?

A    B    C    D    E    F    G

Who contributed the least to the puzzle assembly?

A    B    C    D    E    F    G

Who appeared to enjoy putting together the puzzle the most?

A    B    C    D    E    F    G

Who appeared to enjoy putting together the puzzle the least?

A    B    C    D    E    F    G

Do you think your group had a leader for this activity?

Circle:   Y    N

If yes, who?   A    B    C    D    E    F    G

How would you describe your group's puzzle assembling strategy?

A modified version of the deindividuation scale (Prentice-Dunn & Rogers, 1980) was administered to assess individuals' conscious experiences while engaged in each group activity. The secondary objective of this investigation was to evaluate the utility of this scale for assessing group *rapport*. To this aim, four items were added to the original deindividuation scale and some language was adjusted to apply to the group activities. Because it is not identical to the original published scale, the deindividuation scale will be referred to as the “Group Flow”<sup>3</sup> scale for the rest of this report.

#### ***Puzzle Rumble<sup>4</sup> Competition***

The group activity participants engaged in was a jigsaw puzzle task referred to in the research practicum as the “puzzle rumble” competition. Three groups competed at a time. Groups were given a jigsaw puzzle to complete cooperatively with each of their group members. Each group was given the same puzzle during the activity. The puzzles were pre-tested prior to their use to ensure they would be able to be completed within a 35-minute time frame. Every group was competing against the other groups to complete the puzzle fastest. The activity ended either when one of the groups finished the puzzle or when the 35 minutes ran out. Figure 5 is a display of one puzzle rumble session.

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<sup>3</sup> The “Group Flow” scale name was chosen due to the noted similarities between the deindividuation construct and that of psychological flow (Csikszentmihalyi, 2008).

<sup>4</sup> Nicholas Reyna was responsible for naming this activity (Reyna, 2007).

**Figure 5***Puzzle Rumble Competition.****Observer Ratings of Rapport***

Trained raters ( $N = 9$ ) assessed rapport related attributes derived from Tickle-Degnen and Rosenthal's (1990) theory of rapport. The entire rating sheet with descriptions is displayed in Appendix C. Specifically, they rated mutual attention, positivity, and nonverbal coordination on a 1-7 scale. They also provided a gestalt impression of entitativity (Campbell, 1958; Lickel et al., 2000) by assessing each group according to the following criterion: "Unity is the degree to which groups presented as one cohesive unit as opposed to separate units. To what degree was this group unified during the activity?" Interactional synchrony (e.g., Bernieri & Rosenthal, 1991; LaFrance & Broadbent, 1976) was assessed as well. This included the *posture similarity* and *simultaneous posture shifts* shared by group members. Finally, they rated group *proximity* and *structure*.

The research assistants made their ratings of these constructs using the clips from the puzzle rumble videos. The stimuli were created by employing

thin slice methodology (e.g., Ambady & Rosenthal, 1992; 1993). Each video of the groups engaging in the puzzle rumble task had seven ten-second clips extracted. These clips were spaced evenly throughout each video. The beginning and end of the task were the time points that bookended the thin slice clips within one video. The first ten seconds of the group's interaction (as they were beginning the puzzle task) were extracted, the final ten seconds (as the winning group wrapped up the task) were extracted, and five additional ten-second clips spread evenly throughout the middle of the film were extracted to create the seven thin slices that served as stimuli.

There were 24 groups filmed completing the puzzle rumble task. The seven clips from each group generated 168 thin-slice clips (24 groups x 7 clips = 168 total clips). Bernieri and colleagues (1994) reported an interrater reliability coefficient of  $r = .19$  for judgments of movement synchrony. Given that level of reliability, it was determined that 9 raters would be needed to generate an effective reliability via the Spearman-Brown effective reliability formula (Rosenthal & Rosnow, 2008) of at least  $r = .69$ . This is the justification for recruiting nine raters.

Following the procedures established by Bernieri and colleagues (1994), raters were instructed to view the clips as many times as necessary in order to complete these perceptual judgments of movement. The order of the ratings for the research assistants was counterbalanced such that three research assistants completed the ratings chronologically in ascending order and the two remaining research assistants completed them in descending order. All



raters were instructed to view clips of the three groups who competed in a session back to back rather than viewing all the clips for one group before moving on to the next group. This was because it was preferred that rater sensitivity would be maximized for between-group effects as opposed to within-group effects across time.

### ***Tests of Group Rapport***

It was expected that groups who experienced the most rapport and cohesion were the ones that would complete the puzzle rumble task in the shortest amount of time. Presumably, the rapport built by the groups would give them a communicative edge in the competition relative to low-rapport groups. Therefore, the test of group rapport was whether groups won their puzzle rumble round. Because the puzzle rumble was a competitive task between three groups, a winner always emerged from the task. When time ran out and no group completed the puzzle by the time limit, the winner was determined by the number of puzzle pieces each group managed to put together in the time allotted.

## **Results**

There were three research objectives: a) integrate elements of three distinct literatures - entitativity, deindividuation, and rapport to improve our understanding of how intragroup processes relate to group rapport; b) Examine the convergence of three data sources: self-report, observer ratings,

and test data for the study of group rapport; and c) test the expressivity-rapport relationship proposed by Tickle-Degnen (2006) in the group setting.

The first section (Group Rapport) examines the psychometric properties of and present simple statistics for the group rapport measures. It will also present the interrelationships between data sources and constructs (by presenting a multimethod matrix of the relevant effects). The second section (Nonverbal Expressivity) reports the simple statistics and psychometric properties for the expressivity measures employed. Another multimethod matrix of the interrelationships between expressivity assessments is provided. Finally, in the third section the hypothesis that expressivity is positively associated with group rapport is tested. For this test of group rapport, groups rather than individuals will be used as the units of analysis.

### **Group Rapport**

There were three sources of data that measured group rapport: self-report, observer report, and test data. In this section, all data is coming from the Puzzle Rumble activity unless otherwise specified. One of the primary objectives in this section is to discover whether measures of group rapport predict group outcomes (i.e., winning the puzzle rumble). This outcome is most important because it represents group effectiveness and productivity.

### ***Self-Reported Rapport***

**Group Flow Scale<sup>5</sup>.** The revised *Group Flow* scale was subjected to a Principal-Axis Factor Analysis (PAFA) in order to evaluate whether the

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<sup>5</sup> As described above, this was a slightly modified version of the deindividuation scale created by Prentice-Dunn and Rogers (1980).

extracted factors were representative of rapport-relevant subconstructs. A PAFA was chosen because that was the same analysis Prentice-Dunn and Rogers (1980) did on the original scale. Extracted factors were rotated using a varimax rotation. The final number of factors extracted were chosen based on the scree plot provided.

The scree plot indicated that two or three factors explained the maximum amount of variance in the scale responses. After reviewing the two-factor output, it was determined to be the most characteristic of the rapport construct. Table 1 displays the two-factor output. Bolded values are the ones that loaded on each factor above the .25 level. Table 1 also displays the results from the analysis reported by Prentice-Dunn and Rogers (1980) in their initial validation of the scale.

**Table 1**

*Principal-Axis Factor Loadings for the Group Flow<sup>a</sup> Scale (2-Component Solution)*

Item #	Factor (Variance Explained)	Present Study		Prentice-Dunn & Rogers, 1980	
		Factor 1 Group Flow (3.68)	Factor 2 Self-Focus (2.13)	Factor 1 Altered Experience	Factor 2 Self-Awareness
10	I found the session invigorating.	<b>.74</b>	-.01	<b>.72</b>	
15	The activity was enjoyable.	<b>.74</b>	-.21	<b>.72</b>	
17	I had a feeling of togetherness or connectedness with my group.	<b>.71</b>	.08	<b>.61</b>	
20	I liked my group.	<b>.70</b>	-.03	<b>.70</b>	
18	I would be willing to volunteer for another session.	<b>.65</b>	-.10	<b>.65</b>	
13	My thoughts during the activity seemed concentrated and focused on the moment.	<b>.52</b>	.04	<b>.68</b>	
1	Time seemed to pass quickly.	<b>.49</b>	<b>-.25</b>	<b>.69</b>	

16	The responsibility for what transpired during the activity was shared equally within the group.	<b>.45</b>	-.17	<b>.44</b>
12	I was primarily responsible for what transpired during the session.	-.11	.05	<b>.83</b>
4	I was concerned with what others were thinking about me.	-.23	<b>.62</b>	<b>.71</b>
2	I felt self-conscious throughout the session.	-.14	<b>.58</b>	<b>.74</b>
11	My thinking was somewhat altered during the session.	.17	<b>.54</b>	<b>.74</b>
3	My emotions were definitely affected by this activity.	<b>.33</b>	<b>.54</b>	<b>.63</b>
8	My sense of individual identity was heightened.	.24	<b>.46</b>	<b>.45</b>
14	I was concerned with what the experimenter was thinking about me.	-.14	<b>.37</b>	<b>.81</b>
5	I felt uninhibited in what I could/should do or say.	.08	-.17	<b>-.63</b>
<b>Added Items<sup>b</sup></b>				
6	When not speaking, I spent a large portion of time planning what I was going to say next.	-.20	<b>.37</b>	
19	During the activity I was visually taking notes of various details in my group's appearance and dress and can provide a detailed description if necessary (e.g., eye color, jewelry, etc.).	-.22	<b>.30</b>	
7	Much effort was required to keep the activity going for the allotted time.	-.14	.21	
9	Even during the activity I was still aware of sounds outside of the room and building (e.g., people talking, doors closing, rain falling).	-.24	.16	

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*Note.*  $N = 115$ . Component loadings above .25 are in bold.

<sup>a</sup>Revised from Prentice-Dunn and Roger's (1980) deindividuation scale (appearing in Appendix D). <sup>b</sup>Items that were not included in Prentice-Dunn and Roger's (1980) original scale.

Prentice-Dunn and Rogers' (1980) construct of "Altered Experience" most closely aligns with the "Group Flow" construct. Similarly, four items in the "Self-Focus" component also matched the "Self-Awareness" factor. The small differences between the two analyses could likely be attributed to the activities that preceded them in the respective studies – in the present

investigation, the puzzle rumble; in Prentice-Dunn and Rogers' (1980) investigation, an anonymity manipulation.

The same PAFA was conducted using the scale data that was generated from the other group activities participants completed over the course of the research practicum (a total of 10 additional activities). The intention was to evaluate whether the output from this subsequent analysis would match the findings from PAFA reported above (i.e., it was a confirmatory analysis). In this analysis, the same two factors were extracted. This output is available in Appendix E. Items 5 and 12 still did not load on either factor. In contrast, items 9 and 7 did load on each factor. Because of the much larger sample size in this analysis ( $N = 755$ ), this provides some evidence that items 7 and 9 account for some relevant variance that was not observable in the prior analysis.

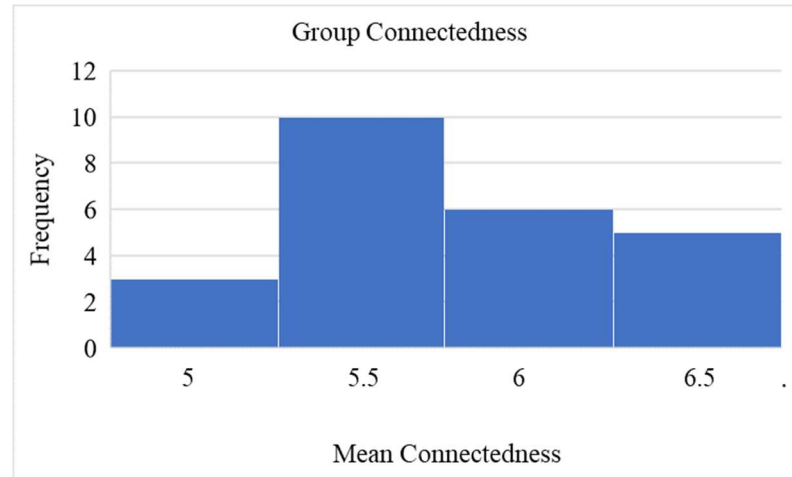
Although the PAFA results converge reasonably well across all 11 activities from the research practicum and with Prentice-Dunn & Rogers (1980) findings (suggesting it might be tapping two aspects of conscious experience), it will be used as a single measure because there was a large, first unrotated factor in both PAFA's that were performed. Therefore, a single 'Group Rapport' composite was created. The reliability (Cronbach's alpha) of the entire 18-item composite was  $\alpha = .75$ .

**Self-Reported Connectedness.** The average self-reported connectedness across the entire sample ( $N = 158$ , three missing data points) was  $M = 5.78$  and  $s = .96$ . A one-way ANOVA revealed a significant

difference in group means of connectedness ( $F_{(23,134)} = 2.19, p = .003, \eta^2 = .27$ ). Self-reported connectedness within groups ranged from  $M = 4.7$  ( $s = 1.11$ ) to  $M = 6.57$  ( $s = .79$ ). Figure 6 displays a histogram of the group means.

**Figure 6**

*Connectedness Group Means*



**Time Perception.** Time perception was measured on a 1-5 scale where 1 was “time passed quickly” and 5 was “time passed slowly.” On average, participants perceived time to pass quickly ( $M = 1.50, s = .62$ ). In contrast to the connectedness item, there were no significant differences between groups in their perception of time passing ( $F_{(23,134)} = 1.08, p = .37, \eta^2 = .16$ ). This item had an extreme positive skew, such that 95% of the group means were less than 2 on the 1-5 scale. This could be attributed to the fact that the puzzle rumble was competitive and had a time limit, therefore drawing attentional resources.

**Intercorrelations.** Table 2 displays the relationships between the self-report measures. Whereas each of the three self-reports were significantly

associated with one another, the effects were not strong enough to indicate there was a substantial amount of overlap in the assessed constructs. Therefore, each of the three will be treated as separate variables for the following analyses.

**Table 2**

Intercorrelations of the Self-Report Rapport Measures

	1	2	3
1. Connectedness	-		
2. Time Perception	-.33***	-	
3. Group Flow Scale <sup>a</sup>	.38***	-.31***	-

*Note.*  $N = 158$ . Time perception was rated on a 1-5 scale where 1 was anchored with “time passed quickly”.

<sup>a</sup> $N = 137$ .

\*\*\* $p < .001$ .

### ***Observer Ratings of Rapport***

Table 3 displays the interrelationships between the eight theorized nonverbal attributes of rapport and entitativity. Interrater reliability for each attribute was assessed by computing intraclass  $r$ 's on rater data. The intraclass  $r$  estimates the degree of reliability between any two randomly selected raters (Rosenthal & Rosnow, 2008). The Spearman-Brown formula was applied to each intraclass  $r$  to yield the effective reliability coefficients for the eight constructs, which are displayed in the table.

**Table 3**

*Interrelationships between Observer Ratings of Rapport*

	1	2	3	4	5	6	7	8
1. Mutual Attention	(.71)							
2. Coordination	<b>.60***</b>	(.71)						
3. Positivity	<b>.51***</b>	<b>.34***</b>	(.90)					
4. Posture Similarity	-.04	.06	.21**	(.89)				
5. Proximity	.53***	.50***	.27***	-.27***	(.92)			
6. Simultaneous Posture Shifts	.52***	.44	.59***	.31***	.31***	(.76)		
7. Structure	.08	.23**	-.13	.04	-.18*	-.09	(.50)	
8. Unity	.75***	.78***	.48***	.00	.72***	.54***	-.06	(.80)

*Note.*  $N = 168$ . Nine research assistants rated each construct.<sup>6</sup>

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

The bolded coefficients represent the interrelationships between the three constructs that make up Tickle-Degnen and Rosenthal's (1987, 1990) theory of rapport. Based on the theoretical relevance, a composite of these three items was formed. That composite will be referred to as "Tickle-Degnen Rapport". The Cronbach's alpha for that composite was .71. An "Entitativity" composite made from *simultaneous posture shifts* (representing common fate), *proximity*, and *unity* was also formed because of the theoretical relevance of these variables for the entitativity construct proposed by Campbell (1958).

The Cronbach's alpha for "Entitativity" was .76.

<sup>6</sup> In the process of creating the composite for mutual attention the ratings made by one research assistant were dropped due to a low item-total correlation.



A Principal Component Analysis was conducted on all eight variables to examine their component structure. The *structure* variable did not load on any component. Therefore, it was dropped from following analyses. There was a fair amount of overlap between the remaining seven items – all loaded on a single component except *posture similarity*. Because of this, an additional composite variable was created that included *mutual attention*, *positivity*, *coordination*, *proximity*, *simultaneous posture shifts*, and *unity*. This composite will be referred to as “Gestalt Rapport” because it contains the rapport components identified by Tickle-Degnen and Rosenthal (1987; 1990) and the measures of entitativity (Campbell, 1958). The Cronbach’s alpha for this composite was .85. The purpose of creating these variables was *not* to test a particular hypothesis, but rather to understand the nuances of the rapport and entitativity constructs. Therefore, this effort should be categorized as exploratory research.

The three composites were highly correlated (*r*’s ranged from .83 to .96,  $p$ ’s < .001). One-way ANOVA’s revealed there were significant differences between groups for each composite (Tickle-Degnen Rapport  $F_{(23,144)} = 2.08$ ,  $p = .005$ ,  $\eta^2 = .25$ ; Entitativity ( $F_{(23,144)} = 1.84$ ,  $p = .017$ ,  $\eta^2 = .23$ , and Gestalt Rapport  $F_{(23,144)} = 2.03$ ,  $p = .007$ ,  $\eta^2 = .24$ ). Although there were ratings across time (RA’s made ratings on seven clips), these ratings were averaged across time to create overall Tickle-Degnen Rapport, Entitativity, and Gestalt Rapport scores for each group. This allows group-level analyses specific to the puzzle rumble competition to be conducted, as it

is the outcome of this competition that was of primary interest.

### ***Rapport as a Group Outcome (Performance Test)***

The outcome criterion for group rapport was winning the Puzzle Rumble competition. Groups that experienced the most rapport should have been more successful at the task because they theoretically would have been more efficient in their communications. Three groups competed at a time, therefore there were 8 winning and 16 losing groups.

### ***Comparison of Data Sources***

To summarize, there were three sources of rapport data: self-report, observer ratings, and group performance. Table 4 displays the group-level ( $N = 24$ ) interrelationships between each of the group rapport variables.

**Table 4**

*Interrelationships between Group Rapport Variables by Data Source*

		Self-Report			Observer Ratings			Test
		1	2 <sup>a</sup>	3	4	5	6	7
<b>Self-Report</b>	1. Connected-ness	-						
	2. Time Perception	-.51 <sup>*</sup>	-					
	3. Group Flow Scale	.79 <sup>***</sup>	-.35	-				
<b>Observer Ratings</b>	4. Tickle-Degnen Rapport	-.05	-.30	.20	-			
	5. Entitativity	.02	-.38	.26	.83 <sup>***</sup>	-		
	6. Gestalt Rapport	.01	-.36	.26	.93 <sup>***</sup>	.97 <sup>***</sup>	-	
<b>Performance Test</b>	7. Puzzle Rumble Win	.52 <sup>**</sup>	-.48 <sup>*</sup>	.60 <sup>**</sup>	.34	.52 <sup>**</sup>	.48 <sup>*</sup>	-

*Note.*  $N = 24$  unless otherwise indicated.

<sup>a</sup> $N = 21$ .

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

All three self-report variables were associated with the puzzle rumble outcome. Even more interesting is the relationship between observer ratings and winning the puzzle rumble. Both Entitativity and Gestalt Rapport were also associated with winning the puzzle rumble competition. This provides evidence for the idea that successful group collaboration can be predicted from brief segments of behavior.

### **Nonverbal Expressivity**

Expressivity was measured using the same three data sources: self-report, observer report, and test data. There was specific interest in whether these sources of data would converge to validate the expressivity construct. In this section, the simple statistics for each data source are presented. At the end of the section, the interrelationships between each measurement are displayed.

#### ***Self-Reported Expressivity***

The self-report measure of expressivity was the ACT (Friedman et al., 1980). The original published mean and standard deviation was  $M = 71.25$  and  $s = 15.8$ . In this sample, the mean and standard deviation were comparable with  $M = 73.6$  and  $s = 15.6$ .

Of the 162 participants in the sample, 58 were men and 104 were women. One man was dropped from analysis due to missing data. Women

scored significantly higher on the ACT than men<sup>7</sup> ( $M_{Women} = 74.90$ ,  $s_{Women} = 15.37$ ;  $M_{Men} = 69.59$ ,  $s_{Men} = 15.31$ ;  $t(159) = 2.10$ ,  $p = .037$ ,  $d = .35$ ). This implies that any analyses that include the ACT should also be controlled for sex.

### ***Observer Rated Expressivity of Targets***

Table 5 displays the interrelationships between each of the five expressivity constructs rated by research assistants ( $N$ 's range from 11 to 19) and the effective reliability coefficients for each construct (calculated using the Spearman-Brown formula applied to the intraclass  $r$ 's for each construct according to the procedures provided by Rosenthal and Rosnow, 2008).

**Table 5**

#### *Interrelationships Between Observer-Rated Expressivity Variables*

	1	2	3	4	5
1. Face <sup>a</sup>	(.96)				
2. Body <sup>a</sup>	.75***	(.97)			
3. Rate of Speech	-.15	-.13	(.91)		
4. Vocal Projection	.35***	.39***	.07	(.92)	
5. Overall Vocal <sup>a</sup>	.60***	.53***	-.14	.83***	(.90)

*Note.*  $N = 160$ , two individuals were dropped due to missing data. \*\*\* $p < .001$ .

<sup>a</sup>Included in the *expressivity composite*.

<sup>7</sup> For the full sample of  $N = 182$ , women scored significantly higher on the ACT than men ( $M_{Women} = 75.57$ ,  $s_{Women} = 15.27$ ;  $M_{Men} = 70.39$ ,  $s_{Men} = 15.70$ ;  $t(180) = 2.19$ ,  $p = .029$ ,  $d = .33$ ).

Rate of speech was uncorrelated with the other expressivity variables. The strongest relationships were between face, body, and overall vocal expressivity. A composite was formed consisting of these three channels because they represent the same nonverbal channels that are utilized in other tests of nonverbal skill (e.g., the Profile of Nonverbal Sensitivity, Rosenthal et al., 1979; Diagnostic Analysis of Nonverbal Accuracy, Nowicki & Duke, 1994). These items were all rated on a 1-8 scale. The mean of the expressivity composite was  $M = 3.77$  and  $s = .58$  (across 160 participants, two participants had missing data). Women were rated as being more expressive than men ( $N_{Women} = 104$ ,  $M_{Women} = 3.88$ ,  $s_{Women} = .52$ ;  $N_{Men} = 56$ ,  $M_{Men} = 3.56$ ,  $s_{Men} = .63$ ;  $t(158) = 3.57$ ,  $p = .001$ ,  $d = .55$ ).

### ***Expressivity Test (Acting Task)***

The expressivity test was modeled after Noller's (1980) standard content model and validated by Raymond (2016). Only  $N = 83$  participants (34 men and 49 women) generated usable data for this analysis due to technical issues. Because some groups had a lower group size, scores were converted into percentages for interpretability. The mean encoding score was 67.90% and the standard deviation was 10.47%. Women received higher encoding scores than men ( $M_{Women} = 70.14\%$ ,  $s_{Women} = 9.17\%$ ;  $M_{Men} = 64.65\%$ ,  $s_{Men} = 11.49\%$ ;  $t(81) = 2.42$ ,  $p = .017$ ,  $d = .528$ ).

### ***Intercorrelations between Expressivity Measures***

The nonverbal expressivity of each participant was assessed via a self-report scale (the ACT; Friedman et al., 1980), observer ratings, and a

performance test (Raymond, 2016) that measured their ability to communicate emotional affect to another person. The interrelationships between these measures are displayed in Table 6. These correlations were calculated controlling for sex.

**Table 6**

*Intercorrelations between Expressivity Measures*

	Self- Report	Observer Report	Test
	1	2	3 <sup>a</sup>
1. ACT	-		
2. Expressivity Ratings	.34***	-	
3. Encoding Skill	.17	.55***	-

*Note.*  $N = 160$ . Partialled for sex.

<sup>a</sup> $N = 83$ .

\*\*\* $p < .001$ .

This table reveals that there is a substantial impact of method variance among the three assessments. Because of this, they will remain separate in the following analyses.

### **Expressivity and Group Rapport**

A major research objective was to examine the relationship between individual expressivity and group rapport. It was expected that the expressivity assessments would predict group rapport. This hypothesis was examined by employing three measures of expressivity and seven measures of group rapport that came from three distinct data sources (methods of

measurement) – self-report scales, observer ratings, and performance tests.

Table 7 displays the relationship between the expressivity measures and group rapport measures by data source. This table is a multitrait-multimethod matrix (Campbell & Fiske, 1959; Fiske & Campbell, 1992). Method variance is typically unaccounted for in psychological research, so this table allows us to examine this variation. Note that  $N = 24$  unless otherwise indicated for this analysis because expressivity assessments were averaged within each group to conduct group-level analyses.

**Table 7**

*Correlations between Measures of Expressivity and Group Rapport*

		<b>Self Report</b>	<b>Observer Ratings</b>	<b>Test</b>
		Affective Comm. Test	Expressivity Ratings	Encoding Skill (Noller) <sup>a</sup>
<b>Self-Report</b>	Connectedness	-.16	-.01	-.26
	Time Perception	-.03	.09	.13
	Group Flow Scale <sup>b</sup>	-.45	-.06	-.16
	Tickle-Degnen Rapport	-.14	.06	.10
<b>Observer Ratings</b>	Gestalt Rapport	-.28	-.03	-.15
	Entitativity	-.31	-.02	-.25
<b>Test</b>	Puzzle Rumble Win	-.60 <sup>**</sup>	-.05	-.27

*Note.*  $N = 24$  unless otherwise indicated.

<sup>a</sup> $N = 12$ . <sup>b</sup> $N = 21$ .

<sup>\*\*</sup> $p < .01$

Most of the relationships between the measures of expressivity and group rapport were weak. Only the relationship between the Affective Communication Test and the Puzzle Rumble outcome was strong and statistically significant, but it was in the opposite direction than expected. It is possible this correlation was spurious given the lack of relationship the ACT exhibited with other measures of group rapport.

Because there was interest in comparing group-level analyses to individual-level analyses the self-reports of group rapport were correlated with the measures of expressivity (which were all individually assessed). Sex was controlled for in these analyses. Table 8 displays these relationships.

**Table 8**

*Interrelationships between Group Rapport and Expressivity Measures  
(Individual-Level Analysis)*

		1	2	3 <sup>a</sup>	4	5	6 <sup>b</sup>
<b>Rapport</b>	1. Connectedness	-					
	2. Time Perception	-.33***	-				
	3. Group Flow Scale	.38***	-.34***	-			
<b>Expressivity</b>	4. ACT Trait	.10	.04	-.05	-		
	5. Expressivity Ratings	.06	-.01	.00	.37***	-	
	6. Acting Task Score	.10	-.14	.10	.17	.55***	-

*Note.*  $N = 157$  unless otherwise indicated.

<sup>a</sup> $N = 136$ . <sup>b</sup> $N = 81$ .

\*\*\* $p < .001$



None of the expressivity measures were strongly associated with group rapport measures. Therefore, nonverbal expressivity does not seem to predict group rapport at either the group or individual level in this sample.

## **Discussion**

Three hypotheses were proposed. The corresponding results for each hypothesis and their implications are discussed below. Next, the overarching research objectives of this thesis are summarized and discussed.

Recommendations for future work is outlined and limitations to the present study is identified. Finally, the utility of this research program for informing intragroup processes literature is summarized.

### **Hypotheses**

***H1: Measures of entitativity and deindividuation will be correlated with measures of rapport because entitativity and rapport share a common fate (simultaneous movement) principle and deindividuation and rapport share a reduced self-awareness (mutual attention) principle.***

**Entitativity.** It was originally noted that entitativity is a unique attribute of groups (Campbell, 1958). Entitativity includes the gestalt principles of similarity, proximity, and common fate (simultaneous movement). When studying entitativity, Moscatelli and Rubini (2013) manipulated participant's perceptions of common fate and proximity principles. They found that common fate had the *strongest* effect on perceptions of entitativity. This is important because simultaneous movement (synchrony or common fate) has long been connected to rapport in dyadic

studies (Bernieri, 1988; Bernieri et al., 1994; Tickle-Degnen, 2006, Lakens & Stel, 2011; Vacharkulksemsuk & Fredrickson, 2012). In the present investigation, observer ratings of entitativity predicted collaborative success (winning) at the puzzle rumble task (which was the test assessment of rapport).

This has substantial implications for group research – it means that cues relevant to group success are “chronically embedded in the behavioral stream” (Ambady et al., 2000) such that a collective of observers can discern the future success of the group. This may seem implausible to some, but there is a precedent for these findings. Stillman and colleagues (2014) ran three studies where they recruited research assistants to rate 10-second clips of group interactions for cohesiveness, defined as “a dynamic process which is reflected in the tendency for a group to remain united in the pursuit of its goals and objectives” (Carron, 1982). This maps on to the entitativity judgements made in this investigation (which were ratings of unity, simultaneous movement, and proximity). In addition, their research assistants rated the mutual trust, communication effectiveness, likelihood of conflict, work effectiveness, and how “in sync” groups were.

The group stimuli were selected from video clips of rock band performances, ultimate frisbee team warmups, and photos of the board of directors of Fortune 500 companies. In all cases, cohesiveness ratings made on 10-seconds of behavior predicted group outcomes. Ratings of rock band cohesiveness predicted the number of views the video of the band would

receive. Ratings of the cohesiveness of ultimate frisbee teams during their warm-ups predicted the total percentage of wins throughout a tournament. Finally, cohesiveness ratings of the photographs of Fortune 500 boards of directors predicted the fiscal success of the companies. Therefore, the present investigation can be considered a replication and extension of these findings.

**Deindividuation.** To assess rapport, a scale originally published by Prentice-Dunn and Rogers (1980) to measure deindividuation was revised and employed. These revisions were made so the scale content would be applicable to the activities the groups would engage in (as opposed to the experience of administering electric shocks to experimental confederates, as Prentice-Dunn and Rogers assigned). The two-component solution provided by the PCA closely matched the two-factor solution originally published by Prentice-Dunn and Rogers (1980). This solution also remained stable across the variety of activities groups engaged in (e.g., eating a meal together), which indicates its potential utility for group research because it may allow researchers to compare group behavior spanning many contexts.

The stability of the scale across many group activities also is consistent with the social identity model of deindividuation. This model of deindividuation states that anonymity changes with the relative saliency of personal vs. social identity. Persons experiencing deindividuation will conform to the norms and values of the group they currently identify with. This means that deindividuated behavior does not have to be deregulated or aggressive – instead, it can be positive and productive. For example, Postmes

and colleagues (2001) found that groups exhibited prosocial behavior when a prosocial group norm was primed and (under anonymous conditions) the group identity was salient.

In this study, groups were assigned to complete a task collaboratively with their group members (the puzzle rumble). The time they had to complete this task was limited and every group member was expected to contribute in order to complete the puzzle faster than the other groups. Since the shared *goal* (i.e., value) among group members was to win the competition, the social identity model of deindividuation would predict that any subsequent “deindividuation” the groups exhibited would be productive in nature, resulting in winning the puzzle rumble. This is what was found, as scoring high on the “Group Flow” scale was also associated with winning the puzzle rumble (the primary rapport outcome). These data are consistent with the notion that deindividuation is the extent to which group members adhere to the dominant group norm and value (Spears, 2017; Vilanova et al., 2017).

***H2: The three sources of data (self-report, observer report, and test data) should converge to validate the group rapport and expressivity constructs.***

Psychological constructs can be measured using self-report data, observer data, and test data (Funder, 2015). Having three sources of data for measurement is useful because it allows researchers to construct multitrait-multimethod matrices (Campbell & Fiske, 1959; Fiske & Campbell, 1992). Several of these matrices were constructed to quantify method variance and

assess the convergent and discriminant validity of specific constructs (group rapport and expressivity).

**Group Rapport.** The first construct assessed was group rapport. There were three measures of self-reported rapport, three measures of observer-reported rapport, and one measure of test rapport. The strongest relationships were within-method assessments. Correlations ranged from .79 to .97. This is not necessarily surprising, given that measures made using a particular method (e.g., all self-report) agree more often than not (Campbell & Fiske, 1959).

The most important characteristic of the matrices to evaluate is the convergent validity of group rapport. Campbell and Fiske (1959) warned that many researchers may fall into the trap of assuming they have created a valid measure of a construct simply by assembling items together based literature or intuition and then employing it in isolation in their studies. Instead, they recommend researchers evaluate the *methodological triangulation* (also called convergent operationalism, Garner, 1954; Garner, Hake, & Eriksen, 1956) of the construct. In other words, researchers should assess the agreement between measures of the same construct using three data collection methods.

For group rapport, there was agreement between the self-report measures of rapport and the test measure (winning the puzzle rumble). In addition, there was agreement between the observer ratings and test measure. The *disagreement* was between the self-report measures and the observer ratings. *None* of the self-report measures correlated with the observer rated

composites of rapport. This discrepancy between self-reports and observer ratings has been noted in the literature (Kenny, 1994; Kenny & West, 2010). Bernieri and colleagues (1994) reported a trait (OCEAN) average self-other accuracy effect size as  $r = .341$ . Kenny and West (2010) reported an effect size of  $r = .395$ . In this study, a uniquely interpersonal phenomenon (rapport) was measured as opposed to a trait-level construct (e.g., the OCEAN model, Costa & McCrae, 1992). The average correlation (calculated by transforming the relevant correlations to Fisher's  $z$  coefficients, averaging, and back-transforming) between self-reported rapport and observer rated rapport was approximately  $r = .21$ . The discrepancy from prior reports is likely due to the fact observers were not rating the exact same constructs as participants self-reported. That is, self-reports of connectedness, time passing quickly, and Group Flow scale scores are not necessarily equivalent to observer ratings of attention, positivity, coordination, simultaneous posture shifts, and proximity, even if both sets (self-report and observer ratings) predicted the same outcome variable (winning the puzzle rumble). Logically, this illustrates that researchers should be mindful when conducting studies that incorporate multiple methods because if multiple constructs are assessed the strength the relationship between self-reports and observer ratings will be lower.

**Nonverbal Expressivity.** There was some convergence between the nonverbal expressivity assessments as well. The strongest relationship was between the observer ratings of expressivity and the encoding score participants received from the acting task. This is likely due to the fact

expressivity ratings were completed using clips from the acting task as stimuli. The relationship between the ACT self-report (Friedman et al., 1980) and the expressivity ratings made by observers was also strong. This provides additional evidence for the validity of the ACT as a measure of charisma and expressivity. Previously, Sy and colleagues (2013) randomly assigned individuals to groups and identified a “leader” in each group. They had the leader take the ACT and found it predicted perceptions of leader charisma by group members. In addition, ACT scores predicted the positive mood among the group one week later. Combined, this evidence indicates scoring high on the ACT does correspond to expressive and charismatic behaviors that are observable to outside others.

Interestingly, the ACT was not associated with the acting task score. This could suggest a discrepancy with how expressive people perceive themselves compared to how effective they are at communicating emotions. This could be a manifestation of the Dunning-Kruger effect as it suggests that people do not have meta-awareness of their own ability levels (Dunning, 2011). It is also possible that the nature of the task did not allow them to fully display their expressive ability. Participants were assigned to communicate nine specific statements, and some participants reported after the fact they had difficulty picturing themselves saying those statements in real life. To address this, future versions of acting tasks modeled after Noller’s (1980) work should pretest the statements that participants will act out to maximize the potential of validly assessing participants’ communication skill.

***H3: Nonverbal expressivity will predict rapport because the perceiver of the nonverbally expressive individual has more of an opportunity to evaluate whether an interaction with that person will be psychologically fulfilling (i.e., rapport-filled).***

It was expected that nonverbal expressivity would predict rapport. Surprisingly, nonverbal expressivity did not predict rapport at either the group or individual level. This is especially unexpected given nonverbal expressivity predicts rapport and liking in dyadic interactions (Nelson et al., 2016; Stosic et al., 2019).

Perhaps this indicates that Warriner (1956) was correct when he theorized that groups are entities that transcend the individuals that constitute them. It is inadvisable to expect individual psychology to extend to group psychology because they have unique psychological processes that are not cross-applicable to other domains. This position was not the one advanced by Allport (1924), who argued that groups should be treated as collections of individuals and it is individual psychology that should be the focus of interest. The results reported here clearly favors the perspective of Warriner (1956) because individual measures of expressivity did *not* predict group-level outcomes whereas group-level features (coordination, mutual attention, etc.) did.

### **Toward a New Theory of Group Rapport**

At the beginning of this thesis, the theoretical overlap between deindividuation, entitativity, and rapport was outlined and discussed. The



utility of employing measures spanning these domains was that it allowed an empirical assessment of the overlap between the three. Interestingly, the Group Flow scale (a revised version of Prentice-Dunn and Roger's deindividuation scale) was the strongest predictor of the puzzle rumble outcome ( $r = .60, p < .01$ ). This was followed by observer rated entitativity (group proximity, simultaneous posture shifts, and unity) and self-reported connectedness (both  $r$ 's =  $.52, p$ 's  $< .01$ ). Notably, the Group Flow scale and observer ratings of entitativity were *not* strongly associated with one another ( $r = .26$ ). This indicates that deindividuation and entitativity separately have more overlap with the rapport construct than they do with one another.

It is interesting that observer ratings of entitativity predicted the puzzle rumble outcome whereas the composite formed based on Tickle-Degnen and Rosenthal's (1987; 1990) theory did not. This theory was originally proposed *for* groups (Tickle-Degnen & Rosenthal 1987) but has typically been tested in dyads (Tickle-Degnen, 1990; Bernieri et al., 1994; Tickle-Degnen, 2006; Nelson et al., 2016). This implies that the entitativity construct (Campbell, 1958) is likely very important for group functioning. The composite measure that combined entitativity and Tickle-Degnen's and Rosenthal's (1990) rapport (Gestalt Rapport) did predict the puzzle rumble outcome due to the variance contributed by the entitativity assessment. For this reason, it is logical that future research attempting to assess group rapport should include some measure of entitativity in addition to Tickle-Degnen and Rosenthal's (1990) rapport components to examine these relationships further.

## **Validating Psychological Constructs**

Following the prescription of Campbell and Fiske's (1959) as to how novel social-personality constructs should be validated, this work presents several multitrait-multimethod tables that allowed examination of the convergent and discriminant validity between constructs. Researchers should make more of an effort to include these sources of data in their own investigations. Unfortunately, many have discussed the importance of doing so but have not executed as recommended. As Fiske and Campbell (1992) noted several decades later, citations do not solve problems. Many psychologists would argue that the most relevant problem in psychological science today is the replication crisis (Simmons et al., 2011; Simons, 2014). Many discussions of how to resolve the replication crisis has centered specific statistical techniques (e.g., Bayesian analyses; Wagenmakers, 2007). These reports generally do not include mention of multimethod assessment when conducting research. This is an approach that would allow researchers to effectively evaluate the convergent validity of a construct and, by extension, the psychological phenomenon of interest. It is recommended that investigators incorporate multiple methods of measurement into their studies, as Campbell and Fiske (1959) proposed.

## **Limitations**

One obvious limitation of the present study is that there were only 24 groups collected for analysis. Although, the sample size in the present investigation was larger than what has been previously reported for ratings of

dynamic group displays. Stillman and colleagues (2014) had only 10 groups of rock bands and ultimate frisbee teams whose videotapes served as stimuli. Their findings were essentially replicated here with a larger sample size, which is an important contribution to this line of research. In addition, this is an ecologically valid paradigm. There are fewer groups in this world than there are people. For example, one would not discount data from 24 countries simply because there were only 24. Still, it is understandable that the stability of the effect sizes presented could be questioned given this  $N$ . Future work should attempt to replicate these findings with a larger number of groups.

Another limitation is that the focus of this study was on one task (the puzzle rumble). This task required participants to collaborate with their group members in order to win a competition. It would be worthwhile to assess groups in alternative environments (e.g., simply talking, collaborating without a competitive task, debating). One cannot be sure that these findings would extend to alternative tasks or environments given that only the puzzle rumble outcome was evaluated.

### **Future Directions**

Researchers should continue to assess the utility of thin slices for predicting group outcomes. Once some predictors of group success are discovered, future investigations can experimentally manipulate these factors to make more definitive recommendations for improved group functioning. For example, Richardson and colleagues (2005) manipulated the verbal and visual information individuals would receive from their conversational

partners when completing a puzzle task and found that visual information facilitated the coordination and completion of the puzzle whereas verbal information did not. Similarly, in a dyadic negotiation task Drolet and Morris (2000) found that individuals arranged face-to-face as opposed to side-to-side were more likely to coordinate and thus earn increased joint gains. These are manipulations that could easily be employed in the group setting. This would reveal something about the nonverbal cues that facilitate or suppress group success.

In addition, researchers should focus on the development of group rapport theory. The present investigation revealed that entitativity (Campbell, 1958) was an important predictor of group success. This could have substantial implications for applied group outcomes. To advance group rapport theory, future research should continue to examine the relationship between entitativity and rapport (i.e., Tickle-Degnen & Rosenthal, 1987). This would be most useful if applied to specific group outcomes as in the present investigation. For example, assessments of entitativity and rapport could predict mean exam scores for student study groups. In a more extreme case, perhaps entitativity and rapport displayed by health care teams predicts the quality of patient care. Discovering whether this is the case depends on researchers focusing their efforts on the advancement of group rapport theory.

## **Conclusion**

An assumption driving this work is the idea that group membership is universal (Forsyth, 2014). All humans are members of at least one group, and

within each group is a set of psychological phenomena known as intragroup processes. A primary intragroup process is *cooperation* (Chizhik et al., 2009). Group cooperation has been examined and discussed in many applied contexts, such as business, health care, and engineering. Discovering how to predict group success has implications for all these domains as it lends to the possibility of improving group functioning to the benefit of all. To make progress toward this goal, researchers should focus their research programs on the collaborative success of groups. Although this is methodologically intensive, there are some benefits. For example, one can predict group success from only ten seconds of behavior.

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## Appendices

## Appendix A

### Acting Task Statements

1. Movie                      “It really wasn't what I expected.”
  - a. They are quite satisfied with the movie, although they really would have preferred what they were expecting.
  - b. They are pleasantly surprised by the unexpected type of movie and **loved it**.
  - c. They **hated it**, but don't want to seem ungrateful.
  
2. Party Mingling            “What are you doing here?”
  - a. They are very **happy** to see this person at the party.
  - b. They are **irritated** because they were hoping this person wouldn't come.
  - c. They thought this person was out of town and didn't think this person would be there.
  
3. Roommate                “What are you doing?”
  - a. They are **angry** that their roommate is doing something that they were asked not to do.
  - b. They have found their friend doing something that looks like a lot of **fun**.
  - c. They want to know what their roommate is doing.
  
4. Dishwasher              “Did you put all the dishes in the dishwasher?”
  - a. They are **angry** because they specifically told their roommate not to put their new expensive bowls in the dishwasher because the plastic would melt.
  - b. They are **delighted** that their roommate has helped out with the chores.
  - c. They are curious to know whether the dishwasher is big enough to fit all of the dishes in it.
  
5. Class                      “So, what do you think of this teacher?”
  - a. They really **like** the teacher and believe their friend does too.
  - b. They **dislike** the teacher and want to complain about him/her to their friend.
  - c. They were just sitting in silence with their friend and are trying to start a conversation.

6. Peanut Butter “Hey, there’s no more peanut butter”
- Their roommate is going to the store this afternoon and they are **relieved/happy** they got a chance to add PB to the shopping list.
  - They’re **mad** because their roommate always eats their peanut butter without leaving them any.
  - They want to let their roommate know that there is no more peanut butter in case their roommate was planning on having some.
7. Surprise Party “Wow, what a surprise”
- They thought they made it clear to their roommate that they don't like surprise birthday parties, and they are a bit **annoyed**.
  - They are surprised by the fact that their friends managed to break into their locked apartment without a key.
  - They are **excited and happy** to see all of their friends.
8. Phone “I’m not sure I want to go”
- They are uncertain about whether or not they’d like to go.
  - They are **angry** with their friend and feel that if they go with their friend tonight they won't enjoy themselves.
  - They want their friend to **encourage** them to go because they would like to see their friend and the performance.
9. Group Project “So this is what you did? That’s really something!”
- They are **impressed** with their roommate’s artistic and organizational abilities.
  - They see a **horrific** jumbled mess of a poster and **cannot believe** anyone would turn in something like that.
  - They walk into a very cluttered room that has several "projects" in various stages of development and want to verify that they are looking at the correct one.

## Appendix B

### Group Activities

Below is the list of group activities that groups engaged in throughout the research practicum. In most cases, instructions for the activity were left deliberately vague so groups would have to decide among themselves what to do. Activities that were completed under experimental supervision are marked with an \*.

1. Design a group logo
2. Eat a meal together
3. Debate about a current event
4. Travel somewhere together
5. Clean something together
6. Play a game together (chosen by the group)
7. Get to know your group members (unstructured conversation)
8. Play charades together\*
9. Complete a deception task\*
10. Complete the acting task\*

## Appendix C

### Definitions of Observer-Rated Rapport Constructs

- 1) Mutual attentiveness is an intense mutual interest in what the other is saying and doing. To what extent was the group mutually attentive during the activity?

1	2	3	4	5	6	7	8
not attentive						very attentive	

- 2) Positivity refers to mutual enjoyment and happiness. How much positivity existed among the group during the activity?

1	2	3	4	5	6	7	8
not positive						very positive	

- 3) Coordination refers to the degree to which the group appeared to be in-sync and harmonious. To what extent was the group coordinated during the activity.

1	2	3	4	5	6	7	8
not coordinated						very coordinated	

- 4) Unity refers to the degree to which groups presented as one cohesive unit as opposed to separate units. To what extent was the group unified during the activity?

1	2	3	4	5	6	7	8
not unified						very unified	

- 5) Structure refers to when groups assign roles to specific members in order to achieve a goal. To what extent did the group have structure during the activity?

1	2	3	4	5	6	7	8
not structured						very structured	

- 6) Proximity refers to the degree of physical closeness between group members. Rate the proximity between group members:

1	2	3	4	5	6	7	8
not close						very close	



- 7) Posture similarity refers to the degree of posture matching among group members (e.g., all standing up, all sitting down). Rate the posture similarity exhibited by group members:

1	2	3	4	5	6	7	8
not similar							very similar

- 8) Simultaneous posture shifts refer to shared changes in posture between all the group members (e.g., when a group throws their hands up together). To what extent did the group share simultaneous posture shifts?

1	2	3	4	5	6	7	8
not at all							very much

## Appendix D

### Prentice-Dunn and Roger's (1980) Deindividuation Scale.

Each of Prentice-Dunn and Roger's (1980) deindividuation scale items are listed below. Every item was rated by participants on a 10-point Likert scale.

#### **Altered Experience Factor**

1. My thinking was somewhat altered
2. My emotions were different from normal
3. I felt aroused
4. Responsibility for the session was shared by the group
5. Time seemed to go quickly
6. My thoughts were concentrated on the moment
7. The session was enjoyable
8. I would be willing to volunteer for a similar study
9. I liked the other group members
10. There was a feeling of togetherness among group members

#### **Self-Awareness Factor**

11. I felt self-conscious
12. I had a heightened sense of individual identity
13. I felt inhibited
14. I had responsibility for harm doing
15. I was concerned with what the experimenter thought of me
16. I was concerned with what the victim thought of me
17. I was concerned with what my group members thought of me

## Appendix E

Principal-Axis Factor Solution ( $N = 755$ )

Item #	Factor (Variance Explained)	Factor 1 Group Flow (4.07)	Factor 2 Self-Focus (2.47)
15	The activity was enjoyable.	<b>.82</b>	.01
10	I found the session invigorating.	<b>.76</b>	.09
1	Time seemed to pass quickly.	<b>.70</b>	-.04
17	I had a feeling of togetherness or connectedness with my group.	<b>.69</b>	.04
18	I would be willing to volunteer for another session.	<b>.66</b>	.05
13	My thoughts during the activity seemed concentrated and focused on the moment.	<b>.59</b>	.14
20	I liked my group.	<b>.59</b>	-.06
16	The responsibility for what transpired during the activity was shared equally within the group.	<b>.47</b>	.02
12	I was primarily responsible for what transpired during the session.	.21	.17
5	I felt uninhibited in what I could/should do or say.	.16	-.06
4	I was concerned with what others were thinking about me.	-.10	<b>.73</b>
2	I felt self-conscious throughout the session.	-.18	<b>.69</b>
14	I was concerned with what the experimenter was thinking about me.	-.09	<b>.51</b>

11	My thinking was somewhat altered during the session.	<b>.28</b>	<b>.50</b>
3	My emotions were definitely affected by this activity.	<b>.27</b>	<b>.49</b>
8	My sense of individual identity was heightened.	.24	<b>.36</b>
<b>Added Items<sup>a</sup></b>			
6	When not speaking, I spent a large portion of time planning what I was going to say next.	-.07	<b>.54</b>
19	During the activity I was visually taking notes of various details in my group's appearance and dress and can provide a detailed description if necessary (e.g., eye color, jewelry, etc.).	-.22	<b>.32</b>
7	Much effort was required to keep the activity going for the allotted time.	<b>-.33</b>	<b>.32</b>
9	Even during the activity I was still aware of sounds outside of the room and building (e.g., people talking, doors closing, rain falling).	<b>-.28</b>	.09

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*Note.*  $N = 755$ . Component loadings above .25 are in bold.

<sup>a</sup>Items that were not included in Prentice-Dunn and Roger's (1980) original scale.