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The Assessment of Interpersonal Attraction and Group Identification in Virtual Group Network

Zuoming Wang

Department of Communication Studies, University of North Texas, Denton, USA
Email: wangz@unt.edu

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Abstract

This study investigates the measurement of social identification, interpersonal attraction, and cohesiveness in virtual groups. Different theoretical claims about relationships in computer-mediated groups rely on measurement strategies that are shown to reflect dramatically inconsistent semantic and administration features. A review of conceptual approaches and definitions for these constructs is presented. Data were collected from groups working asynchronously via the Internet under different geographic distributions, whose members completed a variety of measures related to these constructs. Analyses generated three likely dimensions of attraction. The research highlights the need for greater specificity in reports of the actual measures used in group research, and additional conceptual concerns regarding the contested relationships among these constructs.

Keywords

Virtual Groups, Computer-Mediated Communication, Group Identification, Cohesiveness, Measurement

1. Introduction

Advances in telecommunications have allowed group members to collaborate with each other on their tasks from different locations. Both geographic distribution of members and the use of Computer-Mediated Communication (CMC) as the primary means of communication impact how people relate in virtual groups [1]. Both the distributed nature of groups and the means of communication may affect how group members identify and work with one another. The manner in which they relate, ignore, or scapegoat distant partners has critical impli-

cations for how members feel about their partners, their projects, the level of effort they apply to them, and the success with which they perform [2] [3]; and identification with group partners may affect the degree to which members pay attention to and are influenced by others' information contributions to a group [4]. According to Burke, Aytes, Chidambaram, and Johnson [5], virtual groups vary in their geographic dispersion, with some groups including members from a single location using technology to collaborate, others comprised of people from completely different locations, and others with uneven distributions of collocated and isolated members. How relationship and identification dynamics are systematically affected by variations in geographic dispersion, then, becomes an issue of some importance in understanding virtual groups.

Although several original perspectives have been applied to relationships in CMC groups, the predictions offered by these perspectives concur in some respects and differ in others. In some cases, completely distributed groups may be predicted to function best, and in others, completely collocated groups may function best. The dynamics of mixed groups, with some members in one location and other members elsewhere, should also be considered from the perspective of traditional theories of group dynamics, since some of their members share characteristics in ways that others do not. Building upon traditional and recent work in self-categorization and social identity theory, as well as current research on relational communication and information processing in CMC, a variety of approaches to the relationships among virtual group members present themselves.

This study explores the measurements suggested by these various approaches, and how they differentiate themselves, in order to understand the various requirements dictated by different theoretical approaches to virtual groups, and in order to begin to reconcile inconsistencies among these approaches related to interpersonal attraction, cohesiveness, and social identification in virtual groups.

2. Literature Review

2.1. Social Identification

Social identification principles have been applied to small groups, as well as tentatively applied to differentiate pure virtual groups from face-to-face and "hybrid" groups [6]. When social identity is more salient than personal identity, people see themselves more as part of a group than as an individual, as though partners are equivalent and interchangeable with other ingroup members [7] [8]. Ingroup and outgroup categorization exaggerates perception of similarity between the self and other ingroup members, and differences between self and outgroups. Maximizing the difference between the ingroup and outgroup adds to the esteem of the ingroup. People regard ingroup members as valid sources of information. Group membership therefore provides validation of individuals' cognitions, agreement with ingroup views, and the emergence of ingroup consensus. Outgroup members, in contrast, are less influential in decision making. Concurrently, social identification increases attraction to the group, and at least in the abstract, attraction to its

members.

The social identification approach has been applied most frequently to CMC groups using the social identification/deindividuation (SIDE) model, which argues that text-based CMC (relative to Face-To-Face (FTF) interaction) tends to depersonalize perceptions of self and others and encourages group identification [9] [10]. The visual anonymity of CMC attenuates the perception of intra-group differences that would otherwise individuate group members and undermine the salience of the group. That is to say, the visual anonymity of CMC interacts with the salience of common social categories, raising identification within a group. This in turn leads to an attribution of greater similarity and liking for the group [11] [12].

Some formulations of virtual groups complicate the application of the SIDE and social identification approach. When groups are geographically mixed, subgroups may emerge. When virtual groups are completely distributed, no group identity may emerge, or alternatively, the members may achieve entativity as one group as a whole. Research has not yet demonstrated which of these eventualities is most likely, although speculations have begun to emerge in the literature. Cramton [13], for instance, argued that subgroup identity reflects location, leading to poor social integration in virtual group, and negative attributional judgments when behaviors of remote partners do not reflect collocated partners' norms. Pratt [14] and Thatcher, Jehn, and Zanutto [15] suggest that in groups with mixed distribution of members, identification arises along locational fault lines, with members identifying with subgroups rather than the team as a whole. The fault line effect polarizes and politicizes group's interactions, and is most likely to occur when groups are moderately diverse and when that diversity is especially visible [6]. That is, the mixed conditions are likely to be susceptible to subgroup identity dynamics.

2.2. Interpersonal Attraction and Cohesiveness

At the same time, online groups may affiliate on different bases. For instance, Sassenberg [16] documented that naturally-occurring online groups relate on the basis of group identification or via inter-member attraction. Groups who form and continue on the basis of a common interest or hobby appear to relate via group identification. However, group members who meet online to sustain their interest in one another through social interaction report greater interpersonal attraction. Thus, consideration of both group-based and interpersonally-based attraction remains valuable.

Several studies following or reflecting the Social Information Processing theory of CMC [17] describe the means by which online partners come to like each other and signal their attraction through language, and chronemic cues, as well as the frequency of interaction [3] [18]. Although based in interpersonal attraction principles, it is consistent with recent SIDE-theoretic arguments that interpersonal attraction may be greater where group members individuate one another, where

members are more likely to be acquainted on multiple bases and information sources [19]. It differs markedly from SIDE in that the SIP approach claims that online conversations, without individuating visual cues, may lead just as well to interpersonal impressions and relations as may face-to-face interaction, given sufficient time and message exchange to do so.

An additional approach—the hyperpersonal perspective on CMC [20]—posits that minimal knowledge about a CMC partner, rather than access to a lot of information about a partner, triggers a rewarding online acquaintance-development process leading to inflated levels of affection. The idealized perceptions and freedom to engage in selective self-presentation specified by this framework are most likely to accrue when interaction is not anchored in too much real-world knowledge or a common social network [18].

These different perspectives on group CMC point to different bases of attraction, and according to some perspectives, these bases are theoretically, causally mutually exclusive. From social identification, for instance, although a group member may think he likes another member interpersonally, the actual basis of affection is caused by group identification and not inter-individual affect. Clearly, in order to discern the causal and concurrent bases of relationships in virtual groups and to detect how extrinsic factors may affect them, careful measurement of these underlying constructs is important. As we will see, things have not been as clear as these issues may demand.

2.3. Measurement Issues

2.3.1. Group versus Personal Attraction

Hogg [21] and other social identification theorists [22] maintain that attraction between group members, and attraction to the group as a whole, are conceptually distinct. Hogg [21] argues attraction in traditional studies of group interaction have been conceptualized and measured fundamentally as interpersonal (rather than group) processes, premised on the personal relations and level of interpersonal rewards that group members experience through interaction in a group. Group cohesiveness, likewise, is primarily based on interpersonal attraction [21] [23] [24]. Group identification, in contrast to interpersonal attraction, pertains to attraction to and identification with a group itself in the abstract, a higher-order cognitive/affective phenomenon by which the actual members of a group are not specifically considered.

Despite the clear conceptual distinctions between group and interpersonal constructs, the semantic content of scale items used to assess these constructs is far less distinct. For instance, in Spears and Lea's [9] measure of group identification, we find the item "I feel I can depend on the other students in this group"; in the "task attraction" sub-scale of McCroskey and McCain's [25] measure of interpersonal attraction, we see "if I wanted to get things done, I could probably depend on this person". The ostensibly interpersonal attraction item, "I could not count on him/her to get a job done" from McCroskey and McCain [25] bears a strong resemblance to items intended to assess attraction to a group (e. g., "I can

count on the group to help me when I need help" in Mortensen & Hinds, [26]). The question persists that wording similarities only make more pernicious: are group evaluations really different than the average of inter-individual member evaluations, or are they just measured that way?

2.3.2. Item Administration and Repetition

The second issue concerns the administration, once or multiply, of scales measuring attraction to the group members. When using response scales, no matter what their thematic content, shall they be administered one time per subject, and worded to rate the group as a whole, or should they be worded differently and administered repeatedly by each subject for each partner? It may not be that asking for the level of agreement with the statements "group partner A is nice", "group partner B is nice", and "group partner C is nice"—especially if there is any dissimilarity among these persons—is the same as asking for agreement with a single scale item, e.g., "there are a lot of nice people in this group" [15].

3. Method

In order to explore the possible conceptual and empirical issues related to these various approaches to attraction, cohesion, and identification in virtual groups, among other purposes reported elsewhere, an experiment was conducted employing a variety of measures with which to assess attraction and identification. These included interpersonally-oriented scales such as homophily (perceived similarity; 7 items from McCroskey, Richmond, & Daly [27], task attraction (5 items) and social attraction (6 items; McCroskey & McCain [25], and group-level measures such as 7 items for social identification used in Spears & Lea's [9] SIDE research, the group attitude scale (14 items [28]), shared identity (2 items; [29]), and group cohesiveness (5 items; [30]). Finally, in an initial attempt to explore the interchangeability of group versus interpersonal measures, 3 scale items from previous research on group identification [9] were reworded such that the word "group" was removed and replaced with "Partner A," "Partner B," and "Partner C" as needed in order to assess partners rather than the group as a whole. A total of 53 items were administered to each participant related to these measures, with several items repeated additionally for each partner in the respective group.

3.1. Participants

Sixty-four groups composed of 254 individuals completed participation. The initial participants were recruited from six different colleges in North America. The participants were recruited through classes in Communication, Speech, English, and Psychology, and were given partial course credit for their participation. Participants initially volunteered by accessing a website where they executed informed consent, provided demographic and contact information, indicated with which institution and specific course/instructor they were affiliated, and completed a pre-

test questionnaire. Researchers tentatively assigned those individuals to experimental condition by quota and mailed them paper copies of the experimental task, including experimentally varied instructions and information, and a request to email the researchers with their initial, individual rank-order preferences on the decision task. When researchers received this response, only then did they assign a participant to a group, according to quotas from a predetermined stratified randomized blocked design for the various experimental conditions in the parallel studies being conducted. Since there were differences in the number of volunteers across schools, groups in the collocated or mixed conditions disproportionately involved participants from schools with the greatest numbers of participants. Therefore, the blocking design was employed so that no condition was comprised of members from only one school or combination of schools.

A total of 286 people were assigned to groups. Of these, a small number explicitly withdrew from the project; some others simply did not participate in their discussions. Due to attrition some groups contained three or fewer members; groups with two participating members were excluded from further analysis. Some groups were later removed from the data set due to anomalies in the group assignments with respect to location/distribution, or, based on inspection of responses indicating that participants did not understand or attend to instructions. The final sample included 254 participants in 64 groups, as follows: 84 participants were from "Upstate University" and 37 were from "New York Tech"; 28 came from "Southwest Tech," 80 from "Midwest State," 18 from "Western Community College," and 7 were recruited from "Canadian University". Fifty-eight percent of the participants were female. Twenty-five percent were seniors; 27 percent were juniors, 29 percent were sophomores, 16 percent were freshmen, and 2 percent were master's students. Participants' ages ranged from 17 to 49, with a mean of 21 and mode of 19.

3.2. Virtual Compositions

By drawing on participant volunteers from several colleges in various geographic locations, virtual groups were formed in four experimental conditions, who were charged with reaching a consensus on a hidden profile decision-making task [31]. Three conditions were created to reflect different degrees of member distribution: completely collocated, completely distributed, and geographically mixed with two members in one location and two members isolated.

All participants communicated via an asynchronous discussion board in the Blackboard online courseware system at one university. To enter the Blackboard system, participants used an individual user ID and password, which they had received via email. Every group had a separate discussion board, which was only accessible to its members. On the opening page of the group discussion board, participants saw the name and college logo of each member of their groups. The opening page also contained instructions on how to finish the discussion (en-

tering a "Final Answer" and indicating agreement by each member).

Each group had two weeks to arrive at the decision, during which the group discussion boards were available twenty four hours a day. The starting date for each group was counted from the day the group members received their individual user IDs and passwords. The participants were instructed to do all their electronic communication via the group discussion board, and refrain from using email, electronic chats, phone, or other electronic means of communication to interact about this project, in order to maintain complete records of the discussion. The only exception was that face-to-face communication among collocated members was not explicitly discouraged; while meeting that way would potentially eliminate records, concerns over ecological validity outweighed recoding concerns. However, inspection of the transcripts indicated that no face-to-face interactions took place. Transcripts also indicated that one group used Instant Messenger, and that group was removed from further analysis.

4. Results

All 53 of the items from these measures were subjected to exploratory factor analysis with principal axis extraction and orthogonal (Varimax) rotation, using scores from each subject's group-oriented scales and his or her scores from only one of the partners on the partner-oriented items. Initial analysis indicated, based on the eigenvalues greater than 1, that as many as 11 factors might be retained, accounting for 68% of the variance. However, examination of the Scree test and corresponding coefficients of incremental variance accounted for by additional factors suggested a useful set of five factors at most, accounting for 52% of the variance. A forced, five-factor solution was requested, the results of which were interpreted retaining items on factors for which the primary loading exceeded 0.50 and no secondary loadings exceeded 0.50.

4.1. Group versus Partner Assessments Differ

This inspection revealed, first, that none of the items that contained the word "group" loaded satisfactorily on the same factors as any items containing the "partner" wording. Two factors reflected different clusters of "group" items, one of which included the measures of cohesiveness (which, according to Hogg [21] reflects an interpersonal construct but, as noted, was administered to each subject only once). Of the remaining three factors, one contained almost exclusively positively-worded items from all of the "partner" scales, and another contained most of the negatively-worded "partner" items. The final factor did not achieve satisfactory loadings using the a priori criteria. On that basis, a forced 4-factor solution was requested, which replicated, approximately, the first four factors, above. Suspecting method effect at least as far as the positively and negatively worded "partner" items were concerned [32] a 3-factor solution was forced which accounted for 42% of the variance, and while the two group-oriented factors more or less re-emerged, the partner-oriented items (both positively and negatively word-

ed) collapsed into one factor.

Inspection of the items suggested one factor for group cohesiveness and satisfaction, another for group identification/involvement, and one for interpersonal attraction (see Table 1).

To see if the clustering of item wordings for "group" versus "partner" maintained, a 2-factor solution was forced. This resulted in all "group" items on one factor and all "partner" items on the other factor. However, many variables did not achieve the requisite factor loadings, and the 3-factor solution appeared to be more useful than the forced 2-factor version. Reliabilities were very strong for the 3-factor solution, with Cronbach α on cohesiveness = 0.88, group identification/involvement $\alpha = 0.91$, and interpersonal liking $\alpha = 0.90$. Given the quality of the factor solutions, the high alpha reliabilities, and the consistency with theory on the nature of identification, group attraction, and interpersonal attraction, these subscales might be the most useful for future research in which each dimension of attraction bears investigation.

4.2. The Group May Be the Same or Different from the Average Member

One additional analysis was conducted involving a different version of the data in order to investigate a lingering question about the relationships of group versus interpersonal attraction: Is group attraction, as Hogg [21] claims, really different than the average of inter-member attraction? To address this question, rather than use each subject's responses on "person" items with regard to only one of his or her partners, data were computed to derive means representing each subject's average attraction to all his or her partners—the average of members. These mean scores were entered into a factor analysis along with each subject's scores from the "group"-worded items. Once again, an 11-factor solution was allowable, but for the sake of comparisons with the previous set, a 2-factor solution was forced. In this case involving group-level scores and average partner scores, and using the same retention criteria as before, there were numerous crossovers in the final factor structure. For instance, one of the factors has group items (e.g., "I am dissatisfied with this group" and "the group is composed of people who fit together") as well as individual items (e.g., "I would enjoying on any task with the person" and "I think the person could be a friend of mine"). This analysis brings back the question of whether an individual's attraction to a group qua group is conceptually distinct from an individual's attraction to the average member of the group, and this exploratory analysis suggests that the two concepts are not empirically distinct. The theoretical argument deserves greater empirical scrutiny, and suggests a strong onus on researchers to report their measurements in great detail.

4.3. Discriminant Validity

Finally, the interrelationships among these subscale measures was assessed, along

Table 1. Factor and item loadings for 3-factor solution of attraction, cohesiveness, and identification scales.

Item	Interpersonal attraction	Cohesiveness	Group identification	Source
I'd enjoy working with on any task with person B	0.860	0.217	0.055	McCroskey & McCain, Task
I would do a project again with person B	0.813	0.202	0.069	McCroskey & McCain, Task
Person B Is dependable	0.806	0.210	0.051	McCroskey & McCain, Task
I enjoyed working with person B	0.783	0.245	0.166	McCroskey & McCain, Task
Person B is unreliable	0.699	0.165	0.028	McCroskey & McCain, Social
Person B could be a friend of mine	0.698	0.041	−0.013	McCroskey & McCain, Social
Person B's opinion's are important	0.691	0.137	0.168	Spears & Lea
Person B is lazy	0.683	0.075	0.034	McCroskey & McCain, Task
I'd like to have a friendly chat with person B	0.679	0.069	−0.018	McCroskey & McCain, Social
I'd like to socialize with person B	0.659	0.021	0.273	McCroskey & McCain, Social
Person B is not very friendly	0.651	−0.011	0.241	McCroskey & McCain, Social
Person B was sociable with me	0.634	0.124	0.041	McCroskey & McCain, Social
I feel a bond with person B	0.568	0.156	−0.015	Spears & Lea
Person B similar to me	0.544	0.161	−0.019	McCroskey & McCain, Task
I feel uneasy with person B	0.494	−0.102	0.194	McCroskey, Richmond & Daly
Person B doesn't think like me	0.485	0.019	0.208	Spears & Lea
Person B is from a similar social class	0.343	0.072	−0.050	McCroskey, Richmond & Daly
Person B has experiences like me	0.289	0.066	−0.092	McCroskey, Richmond & Daly
Person B has problems like my own	0.264	0.092	−0.125	McCroskey, Richmond & Daly
Person B's background different from mine	0.109	0.088	0.076	McCroskey, Richmond & Daly
I like the group	0.211	0.804	0.343	Piper *et al.*
I feel satisfied with the group's performance	0.140	0.714	0.160	Gouran
Feel about moving to another group	0.033	0.696	0.131	Seashore
Would have moved to another group	0.129	0.692	0.125	Evans & Jarvis
I liked this group	0.169	0.680	0.461	Evans & Jarvis
The people in this group fit together	0.274	0.661	0.292	Piper *et al.*
I feel attracted to the group	0.163	0.652	0.348	Piper *et al.*
I was dissatisfied with this group	0.109	0.629	0.057	Evans & Jarvis
A feeling of unity existed in this group	0.210	0.612	0.362	Evans & Jarvis
I was satisfied with the group's solution	0.219	0.396	0.310	Gouran
Group members are similar to one another	0.146	0.325	0.037	Spears & Lea
People stick together compared to other groups	−0.061	−0.180	0.039	Seashore
People help each other on the task compared to other groups	0.003	−0.178	0.083	Seashore

Continued

This group was unique	0.088	0.168	0.057	Spears & Lea
Group members are different than one another	0.070	0.167	−0.010	Spears & Lea
People g*et al*ong in comparison to other groups	−0.034	0.109	0.020	Seashore
I did not feel a part of the group	0.090	0.090	0.677	Evans & Jarvis
I see myself as a member of this group	0.134	0.171	0.673	Spears & Lea
I felt involved in the group	0.148	0.138	0.667	Tyler
I didn't care what happened in this group	−0.003	−0.053	0.650	Evans & Jarvis
This group was important to me	0.083	0.338	0.633	Evans & Jarvis
I am pleased to be a member of this group	0.145	0.582	0.606	Tyler
I felt distant from the group	0.081	0.129	0.593	Evans & Jarvis
I looked forward to interacting w/this group	0.074	0.458	0.587	Evans & Jarvis
I felt loyal toward the group	0.010	0.319	0.575	Tyler
I want to remain a group member	0.134	0.441	0.573	Evans & Jarvis
I felt included in the group's activities	0.108	0.362	0.534	Evans & Jarvis
It makes a difference to me how the group turned out	0.014	0.051	0.523	Evans & Jarvis
My absence would not matter to the group	−0.056	−0.021	0.518	Evans & Jarvis
You feel are you really a part of your group	−0.052	0.055	0.448	Seashore
I would have dropped out of this group	0.074	0.381	0.423	Evans & Jarvis
Person B's economic situation is different from mine	0.112	0.094	0.115	McCroskey, Richmond & Daly

with a derived term suggesting inter-member differentiation. This additional term represents the difference in interpersonal attraction among a participant's respective partners, computed as the mean of the absolute values of attraction toward each partner minus attraction of each other partner. The closer to zero, the more a participant liked his or her partners equally, whereas when this score approached its upper range (6), the more differentiation there was in liking for one partner versus another. Higher scores may thus signal individuation, or a lack of the kind of prototypicality that should be expected when group identification is great.

Theoretically, when group identification is higher, perceived member prototypicality should also be higher, and perceived discrepancies among partners should diminish. However, the correlation analysis revealed that inconsistent with social identity theory, the term for discrepancy in liking among one's partners showed an unexpectedly positive relationship with group identification, $r(235) = 0.20$, $p = 0.002$ (whereas the relationship of the discrepancy score with cohesiveness was, as expected, negative, $r[235] = -0.15$, $p = 0.02$).

5. Conclusions

Questions about group and individual evaluations, and the measurements of these outcomes, have become more important as these theoretical issues related to virtual groups take shape. The challenge rose by these issues strike at some central assumptions of major models guiding previous research on online groups that the members of a relatively homogenous or anonymous group are (at least to researchers) individually indistinct and internally isomorphic with respect to their development over time. Alternatively, it is possible that in a group—online or off—members do perceive some systematic or idiosyncratic differences among members, which would affect inter-individual evaluations, leading to some partners to earn different ratings than others. This issue is possible in groups where there are strong categorical commonalities, but subtle potential differences nevertheless at a non-categorical level.

Whereas previous studies have claimed to explore interpersonal bonds relative to group attraction [16] [33], such assessments have employed scales that a participant completes once with respect to the totality of the bonds for all partners (e. g., "there are a lot of nice people in this group" [16]) rather than using repeated, target-specific measures (e.g., "person A was sociable with me", "person B was sociable with me" [34]). Even if gross-level measures of interpersonal attraction are theoretically justified, they thwart the ability to detect inter-individual effects that may accrue due to idiosyncratic causes or, more importantly, systematic effects such as mixed distribution of people and ideas.

Future research instantiating likeable or dislikeable acts within a heightened or lowered social identity is needed in order to gain clarity about how each of these factors affects different levels and measures of attraction. Future research applying comparative confirmatory factor analytic procedures may overcome the limitations imposed by the number of group distribution arrangements in this study, this is beneficial for the future research. It should be clear that research attempting to demonstrate that one or another kind of attraction is operating in virtual groups, and research that wishes to compare two or more kinds of attraction, must use measures appropriate to the level of analysis they claim to assess, which in some cases appears not to have occurred in previous studies.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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