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A MODEL OF ONLINE TRUST

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A MODEL OF ONLINE TRUST
The mediating role of norms and sense of virtual community

Trust among members is an important outcome of virtual communities. Based on identity and social exchange theories, this article proposes a model of trust in which norms and sense of virtual community (SOVC) mediate the relationship between the antecedents of exchanging support, learning identity, creating identity, and sanctioning with the outcome of group trust. The authors surveyed 277 members of 11 active virtual communities. Results generally support our model indicating that the development and adherence to norms as well as members' SOVC play significant roles in the development of group members' trust of each other. This article discusses the theoretical and practical implications of the study.

Keywords computer-mediated-communication; psychology; identity

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Trust is an important component of virtual interactions. Members of both social and professional virtual communities must trust each other to continue their engagement in the group. As members share information and support with each other, they may reveal important personal data (e.g. personal experiences with a problem; weaknesses; 'real life' identifying information) with others in the group. Group members must trust that their essentially anonymous[1] (Joinson & Dietz-Uhler 2002; Birchmeier *et al.* 2005; Utz 2005) communication partners are not going to take that information and exploit, mock, ostracize, or even physically harm them. Therefore, trust of group members is important in virtual communities.

The purpose of this study is to develop and test a model of trust for virtual communities. We propose an integrated model of identity and social exchange perspectives. Specifically, we suggest that both identity processes (i.e. creating one's

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own identity and learning the identity of others) and social exchange processes (i.e. observing, as well as actively engaging in, the exchange of informational and emotional social support) in virtual communities contribute to online trust through their influence on virtual group norms and sense of virtual community (SOVC). Drawing upon past research, we propose that personal and social identity (Walther 1995; Postmes *et al.* 1998) and social exchange processes (Flynn 2005) contribute to the formation of group norms, and that norms promote greater levels of trust (Walther and Bunz 2005). Further, we propose that group members' SOVC (members' feelings of identity, belonging, and attachment) plays a key, yet previously unexamined, role in developing trust. In particular, we suggest that SOVC provides a link between norms and the development of group trust. In this paper, we will develop a model of trust. Then, we will introduce the SOVC construct and demonstrate why it is important in trust.

Trust

Trust can be defined at the collective or group level as 'the belief that a group (a) makes good-faith efforts to behave in accordance with any commitments; (b) is honest in whatever negotiations preceded such commitments; and (c) does not take excessive advantage of another even when the opportunity is available' (Cummings & Bromiley 1996, p. 303). Although trust can be examined between individuals, we feel that trust between members of a group, i.e. social trust (cf. Welch *et al.* 2005), is of primary importance in understanding online *group* interactions. Social trust, as opposed to interpersonal trust, is directed toward the group rather than specific individuals. In virtual communities, where interactions such as exchange of information and support are among the entire group and not just specific individuals, social trust seems particularly relevant (cf., Flynn 2005).

Risk is necessary for the development of trust (Luhmann 1979; Gambetta 1988; Sztompka 1999). If the participant sees little risk of a negative outcome, then trust is not necessary. Previous research suggests that members of virtual communities do perceive risks in their participation. First, there is the risk of communicating with someone who is not who they say they are (Joinson & Dietz-Uhler 2002; Utz 2005). Virtual communities members have responded quite angrily when they discover they have been deceived by other virtual community members (Birchmeier *et al.* 2005). The popular media has also spent a great deal of time warning the public about the risks of interacting with people on line who are deceiving them or are potentially malevolent (e.g. Schwartz 2008). These warnings highlight the risk in members' minds about participating in virtual communities.

Second, members of virtual communities risk embarrassment when they participate in their groups. One participant in a previous study described

posting messages as broadcasting one's opinions to the group with a loudspeaker (Blanchard & Markus 2004). If a member unintentionally violates the group's norms of conduct or expresses an unpopular opinion, he or she could be singled out by the group for unwanted negative attention. As an example, in Blanchard and Markus' study of an online athletic virtual community, members were only allowed to post about commercial topics in certain circumstances. Members who violated this norm of behavior were publicly chastised. In other groups, such as the parenting groups we examine in this study, seemingly innocent comments about particular techniques to encourage an infant to sleep (e.g. crying it out) can devolve into flame wars and name calling.

Therefore, we propose that the development of trust, particularly trust that the group members are honest and are not going to excessively chastise or exploit each other, is quite important in virtual communities. Without this trust, members may not fully participate, withholding advice and personal experiences for fear of retribution. For example, sharing mistakes one has made on the job or marital problems in the scope of parenting may help other members with their own problems, but this information makes the member particularly vulnerable. Without trust, members' inhibitions could jeopardize the viability of the group as members provide less useful information to each other.

Research on trust in online groups has been growing. The development of trust in online groups may be challenging due to the geographical distance separating group members (Jarvenpaa & Leidner 1999) as well as the absence of nonverbal cues in communication (Walther & Bunz 2005). Nonetheless, over time and in spite of these liabilities, trust does develop in virtual groups (Walther & Burgoon 1992; Walther & Bunz 2005). The most recent research identifies processes related to personal and social identity, social exchange, and norm development as important antecedents of trust online (e.g. Henderson & Gilding 2004; Postmes *et al.* 2005; Tanis & Postmes 2005; Walther & Bunz 2005; Wilson *et al.* 2006). Although these variables have been examined separately, little research attempts to unite these various perspectives to understand their interactive role in online trust. The current paper develops an integrative model of trust drawing upon the identity, social exchange, and group norms literatures.

Identity and social identity theories

The issues of personal identity and identifiability have played central roles in understanding behavioral and affective outcomes online. Although online groups may be associated with greater opportunity for anonymity, members of online groups often seek to create 'online' identities (Henderson & Gilding 2004) and may engage in levels of self-disclosure higher than that found in face-to-face (FtF) groups (Walther 1996; Henderson & Gilding 2004). In

addition to establishing their own identity, members of online groups may also seek out information pertaining to the identity of others. Both the establishment of one's own identity online as well as learning about the identity of others have been found to promote higher levels of group-based trust in online environments (Henderson & Gilding 2004; Tanis & Postmes 2005). These findings suggest that the role of identity is important to understanding online trust; however, existing models of computer-mediated communication (CMC) provide contrasting perspectives on the role of identity in group-based outcomes, such as trust.

It was been well established that CMC has fewer social cues than FtF communication (e.g. Kiesler *et al.* 1984). However, the presence of fewer cues does not necessarily mean that identity is less important in CMC than in FtF interactions (see Culnan & Markus 1987). The social information processing (SIP) model argues that while there are fewer personal cues in CMC as compared with FtF interactions, relationship development is the same between online and FtF interactions (Walther 1992, 1995). For example, members still form impressions of each other which they use to make decisions about how similar others are to them (or not), which in turn leads to positive (or negative) relationships. It simply takes a good deal more time and communication effort for an appropriate amount of cues to be accumulated in CMC. Further, research on trust in CMC based on SIP has found that over time (as personal cues accumulate), trust levels are the same between CMC and FtF groups (Walther 1992; Wilson *et al.* 2006), suggesting that increased identity cues eventually contribute to higher levels of trust.

In contrast, the social identity model of deindividuation effects (SIDE) (Postmes *et al.* 1998) suggests that increased cues to personal identity will lead to a decrease in positive group outcomes, such as group trust. Specifically, SIDE suggests that the presence of *any* individuating information (e.g. a name or picture) in CMC highlights the individual identity of online group members, making the social identity of the group less salient (Spears *et al.* 2007), and weakening group-based outcomes.

Both observations and recent research suggest that this may not always be the case. First, much of the early research on SIDE has been conducted in chatrooms and, often, with one time groups (Coleman *et al.* 1999; Lea & Spears 2001; Douglas & McGarty 2002; Michinov *et al.* 2004; Spears *et al.* 2007). Research from one-time interacting groups does not generalize well to ongoing groups (Walther 1995). Additionally, much of the early SIDE research assigned generic names to the study participants (e.g. BAPU or GrpMember1) to maintain anonymity, which may also limit the applicability of their findings to groups with rich identity options available (see Heisler & Crabill 2006). For example, in the ongoing CMC groups in which we are interested, members can reveal significant portions of their (true or pseudonymous) identity through their chosen usernames, avatars, signature files, and even 'real' names, family and work information. Thus, we suggest that establishing identity

in CMC may be more common than previously assumed by the SIDE model, and that the role of identifying information may be different in ongoing groups than in one-time chat groups.

Additionally, we question SIDE's assumption that the presence of individuating cues will always lead to a reduction in group salience. First, Walther's (1996) hyperpersonal model of relationship development (that partially builds on the SIDE and SIP models) addresses the importance of identity cues in positive group outcomes. The hyperpersonal model argues that when members' group identity is salient, members over-interpret the minimal cues that are present and idealize their partners. Thus, minimal cues could increase trust between partners in groups when members identify with the group.

Second, more recent work by Postmes *et al.* (2005) suggests that group and individual identity may coexist. Although this is a new theoretical path for the SIDE model, this line of research accounts for the abundance of identity cues in CMC by proposing that expressions of individuality through communication among group members may actually strengthen group identity and solidarity. They also suggest that expressions of individuality may even be viewed by group members as a cue for inferring trust in the group (i.e. willingness to express an individual opinion or express their individuality signals trust in the group) (Postmes *et al.* 2005).

Our research extends this theoretical line by examining identity cues in developing group trust. Although SIDE originally suggested that cues to others' identity would decrease group-based outcomes, more recent theoretical and empirical evidence from SIP, the hyperpersonal model, and even SIDE suggests that learning cues of other people's identities can accentuate intra-group outcomes, for example, trust. Based on this rationale, we hypothesize that learning the identity of others will increase group-based trust in online groups.

In addition, we want to expand theory and knowledge on how *creating* one's identity affects group outcomes. Previous research has primarily focused on learning others' identity. Creating ones' own identity in the group and believing that others understand it also plays an important role in CMC outcomes (Ma & Agarwal 2007) but it has received far less research attention. Ma and Agarwal are some of the few researchers to focus on how developing one's own identity affects participation in and satisfaction with the virtual community. However, we feel their attention to creating one's own identity highlights a seriously neglected area of the personal and social identities approach. As members learn of others' identities through the use of technological features, they also present information about themselves using these same features. For example, a member may see another member's signature file with the number of children of the member, their ages, and perhaps pictures of the children. The former member then forms an impression about the latter member's identity. The former member may then also want others to form an impression about her.[2]

She, therefore, creates a signature file with information about her children anticipating that others will come to form an impression about her. We suggest that as members perceive others' individual characteristics as providing important cues as to the group's characteristics of solidarity and trustworthiness (Postmes *et al.* 2000; Tanis & Postmes 2005), they may perceive that their own identity cues will do the same.

As illustrated in the examples above, one way that members may create their own and learn about others' identities is through the use of various types of technology features that are available to the community. For example, members may create their own, as well as view others' usernames, avatars, and signature files containing information about family, work, or other personal information. The cues that are provided through these identity technologies allow individuals to develop their own identity online and also learn about others' identities. Because use of identity technologies, such as avatars, usernames, and signature files, contribute to learning identities, we predict that their use will also be associated with increased trust. Therefore, we hypothesize that learning others' and creating one's own identity, as well as the use of identity technologies, are positively related to trust within a virtual community.

Social exchange theory

Although learning the identity of other members is an important byproduct of interacting in virtual communities, it is not the main function of member participation. Exchange processes, specifically the exchange of informational and emotional social support, are a very important reason for the existence of many virtual communities (Baym 1997; Wellman & Guilia 1999; Rothaermel & Sugiyama 2001). We feel that we can add to the understanding of trust in virtual communities by examining the exchange of social support behavior by group members through social exchange theories.

There are a variety of ways in which members exchange support in virtual communities. Support may be exchanged publicly in posts for the entire group to read or may occur privately through emails exchanged behind the scenes. Wellman and Gulia (1999) have argued that the public exchange of support may increase members' perceptions of being a supportive group when in fact, few people are actually involved in the supportive exchange. Thus, there is a perception that the group is very supportive, even if only a few of the members actually help each other. Nonetheless, because everyone can read the message, all group members benefit from the support exchange even if they were not active in creating it.

Social exchange theory is one of the fundamental theories for understanding behavior between individuals and within groups. It explains why people help each other, why they exchange information, encouragement, and love among other

commodities (Cropanzano & Mitchell 2005). It is based on the near universal norm of reciprocity (Goulder 1960), which can either be direct as in the help exchanged between two people or indirect when help is exchanged with an entire group (Flynn 2005).

Additionally, social exchange theory argues that people's affective attachment is governed by the entity with which they are exchanging support (Flynn 2005). That is, if the exchange is dyadic, the attachment remains between the two social exchange partners. But if the exchange occurs indirectly within a group or organization, the attachment is to the group or the organization.

Several lines of research suggest that social exchange processes do indeed contribute to group-based online trust. For example, Jarvenpaa *et al.* (1998) found that virtual teams that were high in trust exchanged a greater amount of positive information within the team. Further, Jarvenpaa *et al.* (1998) found that exchange of social information promoted initial levels of trust in global virtual teams, while stable levels of communication exchange and prompt responses to messages were associated with higher trust during later stages of the group's existence. Similarly, Walther and Bunz (2005) found that frequent communication among group members and explicit acknowledgement of the information posted by others were strong predictors of trust in virtual teams. Finally, Henderson and Gilding (2004) found that the more members contributed to the group's functioning, the more they were trusted by other group members. Therefore, we hypothesize that exchanging informational and emotional support in a virtual community is positively related to trust.

Development and adherence to group norms

Thus far, we have argued that both identity processes and social exchange processes (i.e. exchange of informational and emotional support) contribute to the development of online group trust. However, what is the mechanism by which these processes lead to trust? The development and adherence to group norms may serve as one important mediator of this relationship. Past research suggests that identity and social identity processes, as well as social exchange processes, lead to the formation of group norms. In online research on identity and norms, members of naturally forming online groups create and then adhere to group specific norms of behavior (Postmes *et al.* 2005). In particular, through learning others members' identity, they inductively create a social identity, and subsequently develop norms about what this group does and what its particular characteristics are (Postmes *et al.* 2005). Similarly, Cropanzano and Mitchell (2005) argue that one of the basic tenets of social exchange theory is that people develop and then are constrained by certain rules of exchange, norms that serve as guidelines for people's interactions. These norms of behavior can develop as

people participate in the exchange (Cropanzano & Mitchell 2005) or by merely watching other people interact (Postmes *et al.* 2005). Thus, as members observe and also participate in the exchange of support, they are developing norms of behavior.

Initial evidence for a link between norms and trust in online groups has also been observed. Walther and Bunz' (2005) research strongly supports that adherence to norms leads to trust. Following SIP and general principles of successful virtual groups, Walther and Bunz found that the more people report that they adhered to predetermined rules of behavior, the more they trusted the members of their group. Following group norms serves as an explicit test of an individual's trustworthiness (Goulder 1960). Thus, virtual groups that believe that their group follows particular norms of behavior are more likely to feel their group is trustworthy. In the present work, under the auspices of social identity theory, we expect that learning and creating identity will lead to the development of, and adherence to, group norms, which will subsequently lead to trust. Similarly, through the lens of social exchange theory, we hypothesize that norms will mediate the relationship between exchanging support and trust.

Sanctioning

We also suggest that sanctioning, i.e. members correcting each others' inappropriate behavior, has an important negative relationship to trust. Sanctions have a close relationship to norms. In this study, norms are cognitions of what is appropriate within the group. Sanctions, on the other hand, are behaviors to indicate when someone has violated the norms of the group (i.e. behaved inappropriately). Sanctions play an important and, potentially, distinct role in online interactions because the options for effective sanctioning are limited as compared with FtF interactions (Blanchard 2004). For example, in FtF interactions, ignoring someone who is behaving inappropriately can be quite obvious, but is not obvious at all online. Therefore, choosing to act to sanction someone's behavior must require obvious forethought and, therefore, we believe is unique in our model.

Nonetheless, we argue that if following group norms is a test of an individual's trustworthiness (Goulder 1960), then seeing evidence that group members do not follow the group's norms and have to be sanctioned should have a negative effect on the trustworthiness of the members. Prevalence of inflammatory comments (e.g. teasing, antagonistic remarks, and offensive language), behavior that would seemingly violate group norms, has been associated with lower levels of trust in virtual teams (Wilson *et al.* 2006). Sanctioning online includes telling people that their behavior is inappropriate and can even involve very hostile messages, known as flames. Members can observe others' sanctioning through the public posting of messages or they can be told themselves that their behavior is inappropriate.

It is unlikely that sanctioning would be a mediator to trust like the development of norms. Certainly, sanctioning is likely to occur around the same time in the developmental processes of a group; once norms are established, then violations of norms are likely to occur, too. However, the processes that we propose are critical in establishing norms, specifically exchanging support and creating and learning identity are not likely to be more or less related to sanctioning. Therefore, we hypothesize that sanctioning is an important, independent, negative antecedent to trust.

Sense of virtual community

We have thus far developed a model of trust in virtual communities, in which social identity and social exchange processes lead to trust through the development and adherence to group norms. However, we feel that one of the key antecedents of trust, which has not yet been identified, is SOVC, defined as members' feelings of identity, belonging, and attachment with each other. Community psychologists have long considered sense of community (SOC) as an important feature of FtF communities (McMillan & Chavis 1986; Chipuer & Pretty 1999; Fisher *et al.* 2002; Obst & White 2004) and virtual community researchers are beginning to pay attention to these feelings in virtual groups, as well (Rheingold 1993; Obst *et al.* 2002; Roberts *et al.* 2002; Koh & Kim 2003; Blanchard & Markus 2004).

We suggest that SOVC is a neglected construct in virtual community research, yet it is a key component of many group outcomes researchers seek to understand. First, SOC is one of the key psychological constructs of FtF community research (Sarason 1974, 1986; Chavis & Pretty 1999; Chipuer & Pretty 1999; Bess *et al.* 2002; Obst & White 2004) and is very desired in a community because it leads to satisfaction with and commitment to the community (Burroughs & Eby 1998), and is associated with involvement in community activities and problem-focused coping behavior (McMillan & Chavis 1986). Second, the SOVC construct, analogous to the FtF SOC construct, allows us to conceptualize and analyze member attachment to an entity that is larger than a group but not as formal as an organization. It also draws on the substantial amount of community psychology research which has examined SOC in FtF communities. To neglect this construct, we propose, is to potentially miss an important construct in virtual community research.

For our purposes, we note that SOC in FtF communities has been linked to the development of trust (McMillan 1996; West 2001; Terrion & Ashforth 2002). We propose that SOVC will likewise be related to trust in virtual communities. In particular, we hypothesize that SOVC will mediate the relationship between norms, sanctioning and trust. We use the following reasoning in placing SOVC where we do in our model. First, in their original model of FtF SOC,

McMillan and Chavis (1986) posited that community norms play a significant role in the development of SOC. They argue that as the community becomes more cohesive, there is a greater pressure on the community members to conform. This pressure creates a consensual validation among the community members, essentially a feeling that 'we are alike'. This feeling develops into members' SOC. As members more closely adhere to the norms of the community, their bond to the community increases. Thus, development and adherence to norms closely precede SOC in FtF communities. We suggest that they will similarly lead to SOVC in virtual communities.

Although McMillan and Chavis do not address sanctioning of inappropriate behavior in their model, we suggest that sanctioning will have a negative effect on members' SOVC. Whereas perceiving that 'we are all alike' will increase members' SOVC, seeing direct evidence that 'we are not' should decrease SOVC. In particular, if members are sanctioned themselves, it is likely that it will strongly decrease their SOVC. Having one's behavior highlighted as inappropriate for the virtual community would very likely diminish one's feelings that one is just like everyone else. Therefore, we hypothesize that sanctioning is negatively related to SOVC.

Further, we argue that SOVC precedes trust and mediates its relationships between norms and sanctioning. Users can choose from dozens if not hundreds or possibly thousands of virtual communities about a particular topic (Ren *et al.* 2007). One could argue that with this magnitude of virtual communities to choose from, users may not perceive a risk in participating in any one of them. Because users can choose from many different yet similar groups, they can post whatever they would like without regard to any of the other members or to how their posts might cause negative reactions in others.

However, once a user develops an attachment to a particular virtual community, i.e. 'an SOVC', this is no longer true. Risk in participating increases. As we discussed previously, the user could risk developing attachments to others who are not real. They could also risk being called out in front of a group they care about for inappropriate or inaccurate posts. Because perceived risk is necessary for trust (Luhmann 1979; Gambetta 1988; Sztompka 1999), then it is reasonable to propose that trust in the group develops after the user becomes emotionally attached to the group. Therefore, SOVC precedes trust. Figure 1 presents our model of trust in virtual communities.

Methods

Participants

Participants were 277 members of 11 bulletin boards from Babycenter.com, a very active online information, support, and commercial centre for parents.

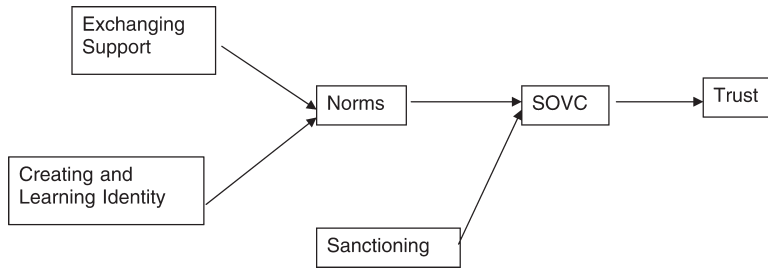

FIGURE 1 Proposed study model.

The groups were non-randomly chosen to reflect different stages of parenting including general topics from pregnancy to early parenthood and more specific parenting topics such as holistic parenting and childbirth options. All the bulletin boards met the same minimal level of activity during the observation period, with messages posted daily and interactive threads. Participants were recruited when the Babycenter.com's research coordinator posted an announcement of the research project to each group and a link to the online survey. Average age of the participants was 29 (sd = 4.29) and 99 percent of the respondents were women, which is typical for Babycenter.com.

Measures

Learning identity, creating identity, and identity technologies. Three items were developed to assess people's perceptions of learning others' identity and three items were developed for perceptions of creating one's identity (See Appendix A for this and all measures). Participants were asked how much they agreed with these items and responses ranged from 1 = strongly disagree to 7 = strongly agree.

In addition to assessing members' perceptions that they know others' identities and that others know theirs, we developed three items to assess their use of identity technologies. Responses ranged from 1 = never to 6 = all the time.

Observing and exchanging support. An extensive list of supportive behaviors was developed to capture the variety of ways in which members of a virtual community can exchange support. These included behaviors that could be observed or enacted (e.g. asked a question, asked for help, asked for support, provided information, and shared experiences) by the members. Sixteen items were developed for observing support and 19 for posting support; 14 items were developed for emailing support because five of the public support items (e.g. posting a short comment and posting a message not related to the topic) were not appropriate in email. Participants were asked how often they engaged in the behaviors and responses ranged from 1 = never to 6 = all the time.

Norms. Four items were developed to assess perceptions of the group's norms. Responses ranged from 1 = strongly disagree to 7 = strongly agree.

Sanctioning. Sanctioning was measured with three items assessing how often the participants saw other people sanctioning, how often they sanctioned other people, and how often they had been sanctioned themselves. Responses ranged from 1 = never to 6 = all the time.

Trust. Trust was assessed using the four items of online group trust from Jarvenpaa and Leidner (1999). This measure was developed from the definition of group trust (Cummings & Bromiley 1996) and is considered a valid measure of online group trust (e.g. Walther & Bunz 2005). Responses ranged from 1 = strongly disagree to 7 = strongly agree.

Sense of virtual community. Eighteen items were used to assess SOVC (Blanchard 2007). Responses ranged from 1 = strongly disagree to 7 = strongly agree.

Results

The first step of our analysis was measurement validation of our items. Although the number of participants in our study represents an acceptable level of power in testing our model once items have been collapsed into their respective scales, the 84 items present a problem in validating our measures through a factor analysis. Estimates are for five times as many observations as there are variables (Stevens 2001) which would call for over 420 observations.

To address this issue, we ran two factor analyses to test our measurement model[3] as well as a confirmatory factor analysis (CFA) to ensure the discriminant validity of our measures. Because assessing the study's measurement model is important in ruling out mono-method bias (Podsakoff *et al.* 2003), we opted to assess our measures as rigorously as possible with the behavior measures evaluated in one analysis (56 items, requiring 280 observations) and the affective and perception measures evaluated in the second (28 items, requiring 140 observations). We chose this strategy because mono-method bias is more likely within measures of similar type (behavior, affect) than between different types of measures (Podsakoff *et al.* 2003). In all of the analyses, we used principal axis factoring with a promax rotation (Fabrigar *et al.* 1999; Costello & Osborne 2005). For the CFA, we chose to analyze only our norm, SOVC, and trust measures to ensure appropriate discriminant validity.

The first factor analysis assessed the three exchanging support, perception of norms, and sanctioning scales. The three sanctioning items did not adequately load together and did not load on any other factors, which further supports

our argument that these variables should be considered separately from perceptions of norms. They were eliminated from the factor analysis, but will be considered as independent forms of sanctioning in the model analysis. Four factors were extracted with the factor structure generally corresponding to our intended variables; however, three items from the observing others exchange support scale loaded inappropriately on the norms factor and were deleted. In the last steps, the communalities of the remaining items were examined and were adequate to reflect the items' reliability within the factor structure.

The second factor analysis assessed the trust, SOVC, and three identity measures. Five factors were extracted that were consistent with the proposed structure of our variables. However, five items were eliminated from the SOVC measure (with 13 items remaining). The five items that were deleted from this scale inappropriately loaded on the identity measures (e.g. 'I can recognize the names of most members in this group' and 'I have friendships with other members in this group'). These five items have been considered important in both FtF SOC and SOVC (Blanchard & Markus 2004; Obst & White 2004). Nonetheless, we chose to take the more conservative route of deleting them from the SOVC scale in case they are a source of bias in our analyses. In the last step, the communalities were examined and determined adequate. We additionally conducted a reliability analysis on the scales (Table 1) with the alphas ranging from 0.65 for the identity technologies scale to 0.99 for emailing support. Although the identity technologies reliability is lower than the others, it is a reasonable value.

For the CFA, we started with the one factor model in which all the items from our norms SOVC, and trust measures loaded onto one overall factor. This model did not fit the data well with χ^2 (135) = 753.27, $p < 0.001$, CFI = 0.85, and RMSEA = 0.14. We tested all permutations of the two factor model and found that the best improvement over the one factor model was SOVC as a single factor and norms and trust loading together χ^2 (134) = 470.49, $p < 0.001$, CFI = 0.90, and RMSEA = 0.10. The final CFA was the three factor model in which the items from the norms, SOVC, and trust measure loaded onto their distinct measure. With a χ^2 (132) = 413.52, $p < 0.001$, CFI = 0.92, and RMSEA = 0.088, this was an improvement over the two factor model, χ^2 $\Delta(16) = 56.97$, $p < 0.001$. Except for the RMSEA, these numbers represent an adequate CFA (Kline 2005). Investigation of the modification indices indicated that one measure from the SOVC could load onto both the norms and trust factors. This measure, 'I think this group is a good place for me to be a member,' likely taps into general positive affect toward the group. Although elimination of this item could improve the RMSEA, we are skeptical about the benefit of deleting items for empirical rather than theoretical reasons (Kline 2005). Therefore, we left this item in the SOVC measure. We note that our subsequent analyses of our model with and without the item did not show any substantive changes in the results.

TABLE 1 Descriptive analysis of study variables.

	Mean	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. Trust	5.37	1.03	(0.87)											
2. SOVC	5.29	1.09	0.74***	(0.94)										
3. Observe support	5.39	0.69	0.20**	0.22***	(0.97)									
4. Email Support	1.76	1.51	0.01	0.01	0.02	(0.99)								
5. Post Support	3.03	1.15	0.39***	0.53***	0.17**	0.16**	(0.97)							
6. Learn Identity	4.92	1.65	0.28***	0.39***	0.17**	0.11	0.48***	(0.91)						
7. Create Identity	4.21	1.98	0.38***	0.53***	0.05	0.10	0.72***	0.71***	(0.95)					
8. Ident. Technology	3.74	1.06	0.20***	0.26***	0.23***	−0.07	0.28***	0.25***	0.27***	(0.65)				
9. Been Sanctioned	1.13	0.43	−0.08	−0.09	−0.07	0.00	0.13*	0.12*	0.12	−0.09	–			
10. I Sanction	1.69	0.88	0.06	0.15**	0.07	0.13*	0.42***	0.30***	0.41***	0.07	0.30***	–		
11. Others Sanction	3.71	1.35	−0.12*	−0.10	0.15*	0.42***	0.00	0.10	−0.00	0.13*	0.01	0.20**	–	
12. Norms	5.99	0.82	0.67***	0.62***	0.17**	0.00	0.32***	0.15**	0.29***	0.21***	−0.08	0.02	−0.04	(0.81)

Note: $N = 277$. Reliabilities are in the diagonal. SOVC, sense of virtual community.

*$p < 0.05$

**$p < 0.01$

***$p < 0.001$

Model testing

Descriptive analyses are presented in Table 1. We analyzed our model through path analysis in structural equation modeling using AMOS IV and conducted Sobel tests for our predicted mediation effects (Baron & Kenny 1986; MacKinnon *et al.* 2002; Shrout & Bolger 2002). We chose to analyze the three processes of exchanging support (observing, posting, and emailing) and the two aspects of identity (learning identity, creating identity) separately in the path analysis, because the factor analysis suggested that while they were correlated, they were not highly enough correlated to be considered part of the same underlying construct.

The original model represented a poor fit to the data with $\chi^2(38) = 125.29$, $p < 0.001$, CFI $= 0.99$, and RMSEA $= 0.095$. Modification indices suggested that the model was missing direct links from the posting support and creating identity variables to SOVC. Because this has been reported in previous research (Blanchard & Markus 2004) and is theoretically plausible, we included these links. We also included a direct link from norms to trust because of the strong relationship found by Walther and Bunz (2005), which suggests that our predicted SOVC mediation is likely to be a partial instead of a full mediation. The resulting model was much improved with $\chi^2(35) = 172.66$, $p < 0.05$, CFI $= 0.99$, and RMSEA $= 0.048$ with the RMSEA 90 percent confidence interval ranging from 0.02 to 0.07. Thus, our adjusted model represents a good fit of the data.

The results of the path analysis from our adjusted model and the individual beta weights are presented in Figure 2. The individual paths are statistically reliable as generally predicted. Posting ($\beta = 0.16$, $p < 0.05$) and observing ($\beta = 0.12$,

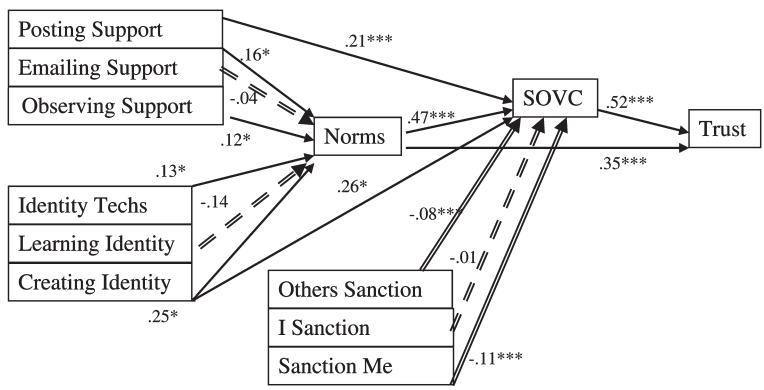

FIGURE 2 Resulting study model.

Note: Numbers are standardized β. Dashed lines indicate that the path is not satistically significant. Double lines indicate a negative relationship. *p < .05, **p < .01, ***p < .001.

$p < 0.05$) support as well as using identity technologies ($\beta = 0.13$, $p < 0.05$) and creating identity ($\beta = 0.25$, $p < 0.05$) are related to norms. Emailing support is not related to norms ($\beta = -0.04$, $p = 0.53$) and learning identity has a negative (though not statistically significant) relationship with norms ($\beta = -0.08$, $p = 0.07$) which is not in the direction we predicted. The perception of norms ($\beta = 0.35$, $p < 0.001$) and SOVC ($\beta = 0.52$, $p < 0.001$) both have strong direct relationships to trust. Although sanctioning others oneself ($\beta = -0.01$, $p = 0.91$) was not related to SOVC, seeing others sanction ($\beta = -0.08$, $p < -.05$) and being sanctioned oneself ($\beta = -0.11$, $p < 0.001$) are related to SOVC as is the perception of norms ($\beta = 0.47$, $p < 0.001$). Additionally, posting support to others ($\beta = 0.21$, $p < 0.001$) and creating an identity ($\beta = 0.25$, $p < 0.001$) have direct relationships to SOVC.

The next step in our analysis is to test our predicted mediators. We used the bootstrapping estimates from AMOS 4.0 to calculate the Sobel test score and the confidence interval of the relationship (Baron & Kenny 1986; MacKinnon *et al.* 2002; Shrout & Bolger 2002). A confidence interval that does not contain 0 as well as a Sobel test greater than 1.96 suggests a statistically reliable mediating relationship. The results of these analyses are presented in Table 2.

The perception of norms mediates the relationships between posting and observing support, creating identity, and using the identity technologies and

TABLE 2 Results of the Sobel mediation test.

	Sobel test	*Confidence interval*
Norms as a trust mediator		
Post support	1.65†	0.02–0.08
Others support	1.83†	0.03–0.10
Learning identity	−1.49	−0.06 to −0.01
Creating identity	2.14*	0.03–0.07
Identity technologies	2.11*	0.03–0.07
SOVC as a trust mediator		
Post support	2.96***	0.07–0.14
Creating identity	3.66***	0.05–0.09
Sanction me	−2.65**	−0.19 to −0.09
Others sanction	−1.86†	−0.05 to −0.01
Norms	6.72***	0.26–0.35

*$p < 0.05$
**$p < 0.01$
***$p < 0.001$
†$p < 0.10$

trust as we predicted. Additionally, SOVC mediates the relationship of posting support, creating identity, being sanctioned oneself, and observing others being sanctioned and norms with trust. These mediating relationships are quite strong, except for observing others being sanctioned which is somewhat weaker.

Discussion

The purpose of this study was to test a model of trust developed from identity and social exchange theories. Specifically, we proposed that the processes of learning and creating one's own identity and of exchanging support would be positively related to members' perceptions of and adherence to norms of the group, and that norms would mediate the relationship between these antecedents and trust. Further, we proposed that norms and sanctioning behaviors' relationship to trust would be mediated by SOVC. For the most part, our model is supported. However, there are some deviations from our predictions that we find very interesting.

First, regarding cues to identity, perceptions of creating identity (i.e. perceiving that others know one's identity) and the use of identity technology (by self and others) were related to the development and adherence to norms, which mediated their relationship to trust. However, the learning of others identities was only marginally related to norms and not in the direction we expected.

This pattern of findings suggests, first, that when members feel they are identifiable and that others know who they are, they show a stronger awareness of group norms, and are more likely to adhere to these rules of behavior. Thus, identifiability of one's own self, i.e. emerging from the background and feeling known, contributes to feelings that there are norms of behavior in the virtual community, perhaps because greater identifiability leads to greater feelings of accountability in the virtual community.

Additionally, the use of identity technology features (both by oneself and by others) contributed to group norms. This variable examined members' self-reported use and awareness of identity-related technology features such as using and reading signature files and believing that others are using their real names in their posting. This, too, is consistent with our previous explanation that greater identifiability leads to greater accountability, and therefore, strengthens group norms. It is also consistent with previous work by Postmes *et al.* (2005) suggesting that a social identity can be formed inductively as individuating information is shared by group members. For example, an awareness that members are willing to share personal information in their signature files and even use their own identity may serve as a cue to strengthen norms and trust within the group. We also note that information contained within signature files and other identity features, while providing personal cues, is often relevant

to group identity as well. For example, signature files of members of the online parenting group studied here often contained pictures or birth dates of children, information that is relevant to the identity of the individual as well as to the identity of the group. The unique nature of the information shared through the identity technology may have lead to an increase in group as well as individual salience. We suggest that this too may account for the relationship found between identity technology usage and group-based outcomes, such as norms and trust.

Although the use of identity technology features strengthened norms, and subsequently, trust, the same does not apply for actually *learning* the identity of others. Knowing the screen names and even the personalities of others within the group did not affect members' perceptions of, or adherence to, norms of the group and perhaps even decreased it. This challenges previous research that indicates that inductive formation of a social identity (through individual expressions of the group members) leads to formation of norms (Postmes *et al.* 2005). However, it is consistent with previous research on the SIDE model and Walther *et al.* (2001) research that suggest that learning names and pictures of online interaction partners decreases the influence of social norms, particularly in long-term groups.

Therefore, we found, as would be expected from previous research on the inductive formation of a social identity (i.e. Postmes *et al.* 2005), that reading the information from members' signature files, perceiving that members use their real names, and even posting this information oneself does contribute to the norms in the group. However, actually feeling that one *knows* the identity of other members does not, which counters the same theory. Why this paradox?

We believe that these relationships support the hyperpersonal (Walther 1996) and SIDE (Postmes *et al.* 1998) models argument that knowing too much about others' identities disrupts the social identity and subsequent group processes. It highlights others as individuals instead of members of 'my group.' Perceiving that others use signature files in their posts and reading these signature files are the sorts of minimal cues that increase group salience. But believing one knows the 'real' names and personalities of others decreases that group salience. Ironically, believing that others know one's own personality does not have this same effect.

In regard to our predictions regarding social exchange theory, we found that observing others exchanging support and posting support oneself were related to norms, but the emailing of support was not. Although emailing was not a prominent behavior in this group, it could also be that the exchange of email is a more dyadic behavior, and therefore does not contribute to the formation and adherence of group norms, but rather to interpersonal norms within the dyad. This is consistent with Flynn's (2005) argument that if an exchange is dyadic, the attachment remains between the two social exchange partners, rather than generalizing to the larger group. This argument can be generalized

to apply to the formation of norms based on group versus dyadic exchange, thus explaining why exchange of email support did not have the predicted effect here.

Based on our findings, we argue that exchange of support at the group level, including merely observing the exchange of support between others, has positive outcomes for the group's functioning, particularly in the development and adherence to group norms, as well as the development of online trust. Although some researchers have questioned whether merely observing the exchange of support is beneficial (Wellman & Guilia 1999), our research shows that it has outcomes that are objectively good for the group.

Like Walther and Bunz (2005), we found that norms for online behavior within the group are very strongly related to the trust of the other virtual community members. Additionally, as we predicted, norms serve as a mediator between our antecedents and trust, and SOVC serves as a mediator between norms and trust. These variables were all quite strongly related. The rigorous approach we took to validate our measurement model suggests that these results reflect true relationships between the variables, and are not simply the result of mono-method bias or overlapping constructs.

SOVC adds even more explanatory power of trust; members' feelings of community increase their belief that their co-members are trustworthy. In addition, SOVC mediates the relationship of both norms and sanctioning to trust. The perception that norms exist in the community and that they are adhered to leads to a greater SOC, ultimately leading to stronger feelings of trust of the online group members. Additionally, seeing other people sanctioned for their inappropriate behavior and being sanctioned oneself decreases SOVC and subsequently trust. Thus, we would argue that when virtual community members see others behaving appropriately, they think they are trustworthy. But when they see members behaving inappropriately, they perceive they are not. Additionally, being told one's behavior is inappropriate decreases one's feelings of community and belief that others can be trusted.

Our findings on sanctioning suggest additional research. We have examined sanctioning from an individual's perspective: 'what are the effects on my SOVC when I sanction, am sanctioned, or see others sanction'. Future research should also consider the sanctioning that accompanies critical incidents in the virtual community's history such as defending off attacks from malicious outsiders (e.g. trolls). These sanctioning events are likely to reinforce the norms of the group and increase solidarity and SOVC as the group coalesces around stopping this inappropriate behavior (e.g. McMillan & Chavis 1986).

One question that emerges from these findings is whether a member who develops trust in one specific virtual community (as studied here) will generalize this trust more broadly to other groups or online interactions in general. We propose that trust formed in one community may generalize – but that this generalization will be limited. First, we suggest that one's initial experience with a virtual community may lead to the development of a schema, which may then be

applied (i.e. generalized) to other virtual communities. As demonstrated in the current research, if a virtual community contains elements of social exchange and identity, members are likely to adhere to norms, building an SOC, and ultimately, trust in the community. As a result, members may develop a schema that virtual communities (in general) are 'trustworthy'.

We suggest that as one gains experience in one virtual community, this schema may be applied to, and influence judgments, in other virtual communities. For example, past research indicates that information that is consistent with our schemas draws attention and is easily remembered (Cody 1981). Thus, if one holds a positive schema of virtual communities as trustworthy, one will be likely to notice and remember new instances of 'trustworthiness' upon joining a new community. Also, schemas, once formed, can be difficult to change. This too suggests that a positive experience of trust formed in one community may be applied to other virtual communities.

However, we propose that such generalization will have limits. For instance, individuals who encounter information or behavior that is inconsistent with their schema, particularly when inconsistencies are strong, persistent, and unambiguous, are likely to attend to and remember that information (Wyer *et al.* 1984). This suggests that holding a schema for 'trust' in online communities may in fact magnify and draw attention to community actions that strongly violate expectations of trustworthiness. We further suggest that in order for trust to generalize to other virtual groups, they must be similar to those in which the members developed their trust. Groups that are very different (e.g. not as much supportive communication) may not be perceived as being 'communities' nor as having trustworthy members. Therefore, we argue that for members who trust their groups, their cognitive schemas may predispose them to believe that other groups have the potential to be trustworthy, but not that they all actually should be trusted.

Taken together, these findings provide support for our proposed model of online trust. This model extends previous work on trust by integrating and extending approaches of identity and social exchange to explain the mechanisms underlying trust. In particular, we examined both learning others' identity as well as creating one's own identity. We also examined both observing and participating in the exchange of support. Further, our examination of SOVC as a mediator between norms and trust is a new contribution to the online trust literature. Our findings support that SOVC represents a key variable in the development of online trust, one that has been previously overlooked in the research literature.

We focus the practical implications of our research on what developers of virtual communities or other virtual groups can do to increase trust between the members. We suggest that developers encourage the public exchange of support and ensure that the technologies supporting the virtual group allow members to post information about their identity (e.g. their real and screen

names and any other group relevant information). Although we do not discourage developers from creating and enforcing their own rules of behavior for the group, we do encourage them to allow enough flexibility for members to create and enforce at least some group specific norms themselves, since group development of norms is shown here to contribute to SOC and trust.

Limitations

Although the current study provides useful insights into the mechanisms underlying the development of online trust, our research also has some limitations. Our results rely on self-report data, which can be associated with social desirability, as well as other response biases. However, although self-report data were used, we attempted where possible to have participants report on actual behaviors that were used by others (i.e. support and identity technologies). Additionally, our measurement model validation suggests that mono-method bias is not a serious problem in these data (Podsakoff *et al.* 2003).

Further, our sample consisted primarily of women, and our chosen community was a social (rather than professional) group. We note that the results reported here are consistent with previous trust research conducted on more diverse groups, suggesting that the mechanisms underlying trust are not specific to a certain gender or type of group. Trust is a universal phenomenon and there is nothing in our model to suggest that it is specific for women only. However, future researchers can validate these findings with more diverse gender groups, as well as other types of online groups (e.g. work or professional groups).

Our sample also consists of virtual community participants who self-selected into our research. A potential problem here is that only those members who have positive views of the group will be likely to participate (Rogelberg *et al.* 2000). To ameliorate this problem, in our recruitment letter for the project we emphasized that we wanted all group members to respond to our survey, whether they participated a little or a lot and whether they had positive or negative feelings about the group. Although we cannot fully test how well we addressed this problem of self-selection, we did address the issue as well as possible while still using self-selection.

We also note that although the direction of the variables assumed here is consistent with previous theory and research, given the nature of our research design, it is not possible to completely rule out that the influence between variables may be reversed or reciprocal. For example, we have proposed that SOVC precedes trust in participants' affective development. Specifically, we argued that members must be attached to the group before they perceive a risk in participating, because perceived risk is necessary for trust. Although we can demonstrate a strong relationship, we cannot completely rule out that trust precedes SOVC or that they occur at about the same time. We also note that issues of trust could be important throughout this model. For

example, trustworthiness is considered a predictor of trust (Bohnet & Croson 2004; Jarvenpaa *et al.* 2004; Welch *et al.* 2005). Trustworthiness could also be a predictor of SOVC, especially when considering the information members gain about others through learning their identity and observing their exchanges of support. We believe these questions should be examined in future research that examines longitudinal changes in virtual community member behavior, attitude, and affect.

Finally, we point out that our SOVC measure is newly developed (Blanchard 2007). It is based on the current and widely used FtF SOC measure from Chavis *et al.* (1986) and adds items to assess aspects that are believed to be unique to SOVC (Blanchard & Markus 2004). The items that we eliminated because of inappropriate loading came from both the FtF SOC measure (e.g. knowing the names of other members) and the new items (e.g. anticipating others' reactions) and were all related to identity. Although these items have been included in previous research to tap into participants' feelings of membership as it relates to SOVC, we believe they may need to be revised and new items to assess feelings of membership should be created. A critical review of these items suggests they relate quite well to creating and learning identity, which is an antecedent of SOVC, and thus should not be considered part of the measure itself. We encourage future researchers to consider this issue when they use either the SOC or SOVC measures. Nonetheless, we note that since relationships were found between identity and SOVC even after eliminating these items, this suggests that the relationship between identity and SOVC is likely quite strong.

Conclusion

Trust is an important and valuable component of group interactions in successful virtual communities. With trust, members can develop thriving groups that meet the social and informational needs of their members. Without trust, the group is likely to die. We conclude that exchanging support between members and having opportunities to develop one's identity can lead to trusting, healthy virtual communities.

Notes

1 Or pseudonymous identities, in which a member's identity does not track with their 'real' identity.
2 Our participants are predominantly women.
3 Variations on the analyses presented here yield very similar results.

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Appendix 1.

Learn identity
Learnid1: I know the screen names of other people in this group.
Learnid2: I know the real names of other people in this group.
Learnid3: I know the personalities of other people in this group.

Create identity
Createid1: Other people in this group know my screen name.
Createid2: Other people in this group know my real name.
Createid3: Other people know my personality in this group.

Use of identity technology
IdTech1: Do people in this group put personal information about themselves or their families at the end of their message?
IdTech2: Do you read the information that people in this group have at the end of their message?
IdTech3: Do people use their real names when they post messages in this group?
IdTech4: Do you put personal information about you or your family at the end of your messages (like names & ages)?

Observe support
In the last month,
Obs: Support1: how often have others asked questions?

Obs: Support2: how often have others asked for help?
Obs: Support3: how often have others asked for others' support?
Obs: Support4: how often have others asked for others' opinions?
Obs: Support5: how often have others asked for others' personal experiences?
Obs: Support6: how often have others asked about topics NOT directly related to the group?*
Obs: Support7: how often have others answered others' questions?
Obs: Support8: how often have others provided information?
Obs: Support9: how often have others provided support?
Obs: Support10: how often have others shared their opinion?
Obs: Support11: how often have others shared their experiences?
Obs: Support12: how often have others shared experiences NOT directly related to the topic?*
Obs: Support13: how often have others posted a short comment on a thread (like 'Me, too' or 'LOL')?*
Obs: Support14: how often have others received answers to their questions?
Obs: Support15: how often have others received information from others?
Obs: Support16: how often have others received support from others?

Email support
In the last month,
Email1: how often have you used email to ask questions?
Email2: how often have you used email to ask for help?
Email3: how often have you used email to ask for others' support?
Email4: how often have you used email to ask for others' opinions?
Email5: how often have you used email to ask for others' personal experiences?
Email6: how often have you used email to ask about topics not directly related to the group?
Email7: how often have you used email to answer others' questions?
Email8: how often have you used email to provide information?
Email9: how often have you used email to provide support?
Email10: how often have you used email to share your opinion?
Email11: how often have you used email to share your own experiences?
Email12: how often have you used email to receive answers to your questions?
Email13: how often have you used email to receive information from others?
Email14: how often have you used email to receive support from others?

Post support
In the last month,
Post: Support4: how often have you asked questions?
Post: Support5: how often have you asked for help?
Post: Support6: how often have you asked for others' support?
Post: Support7: how often have you asked for others' opinions?

Post: Support8: how often have you asked for others' personal experiences?
Post: Support9: how often have you asked about topics NOT directly related to the group?
Post: Support10: how often have you answered others' questions?
Post: Support11: how often have you provided information?
Post: Support12: how often have you provided support?
Post: Support13: how often have you shared your opinion?
Post: Support14: how often have you shared your own experiences?
Post: Support15: how often have you shared your own experiences not directly related to the group's topic?
Post: Support16: how often have you posted a short comment on a thread (like 'Me, too' or 'LOL')?
Post: Support17: how often have you received answers to your questions?
Post: Support18: how often have you received information from others?
Post: Support19: how often have you received support from others?

Norms
Norms1: I understand what appropriate behaviors are for this group.
Norms2: People generally behave appropriately on this group.
Norms3: I approve of what most people post on this group.
Norms4: I believe that most people approve of what I post on this group.

Sanctioning
How often
Sanction1: do other group members post a message to tell people they've posted inappropriate messages?
Sanction2: do you post messages people to tell them they've posted an inappropriate message?
Sanction3: have you been told through a post that you've posted an inappropriate message?

Trust
Trust1: Overall, the people in this group are very trustworthy.
Trust2: We are usually considerate of one another's feelings in this group.
Trust3: The people in this group are friendly.
Trust4: I can rely on the people in this group that I interact with.

Sense of virtual community
SOC1: I think this group is a good place for me to be a member.
SOC2: Other members and I want the same thing from this group.
SOC3: I can recognize the names most members in this group.*
SOC4: I anticipate how some members will react to certain questions or issues in this group.*

SOC5: I feel at home in this group.
SOC6: I care about what other group members think of my actions.
SOC7: If there is a problem in this group, there are members here who can solve it.
SOC8: It is very important to me to be a member of this group.
SOC9: I expect to stay in this group for a long time.
SOC10: I get a lot out of being in this group.
SOC11: My questions are answered by this group.
SOC12: I get support from this group.
SOC13: Some members of this group have friendships with each other.*
SOC14: I have friendships with other members in this group.*
SOC15: Some members of this group can be counted on to help others.
SOC16: I feel obligated to help others in this group.*
SOC17: I really like this group.
SOC18: This group means a lot to me.
*Eliminated in the measurement model