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Sense of belonging based on novel posting: Individuals' processes of social and psychological integration into virtual groups

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Sense of belonging based on novel posting

Individuals' processes of social and psychological integration into virtual groups

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Abstract

Purpose – Although novel posting is a universal phenomenon in virtual communities (VCs), few studies have addressed the benefits of novel posting for group members. The purpose of this paper is to identify the social and psychological outcomes of novel posting, particularly whether and how sense of belonging can be produced by it. Sense of belonging implies an individual's integration or assimilation into virtual groups.

Design/methodology/approach – To assess the theoretical model, a survey was administered in an internet discussion community (Baidu Post Bar in China), and structural equation modeling was then used to test the model.

Findings – Novel posting can produce social and psychological outcomes, such as social interaction ties, group-based self-esteem and sense of belonging. Novel posting is an individualized behavior, which some studies consider to conflict with sense of belonging; however, via the mediating effects of social interaction ties and group-based self-esteem, sense of belonging can also arise based on novel posting.

Practical implications – VC operators should focus on differentiating between irrational posts and novel posts and encourage the latter. Additionally, to satisfy members' needs, VC operators should strengthen the degree of social interaction ties and members' self-esteem by providing attractive topics and virtual rankings.

Originality/value – This study contributes to a theoretical understanding of the social and psychological outcomes of novel posting and, more importantly, whether and how sense of belonging arises on the basis of individualized behavior.

Keywords Sense of belonging, Information management, Novelty, Knowledge creating

Paper type Research paper

Introduction

In this era of technological innovations, the internet, and new media, displaying creativity and expressing differences are possible on a broader scale and can be achieved more quickly and effectively than ever before (Fan and Poole, 2006). For example, numerous virtual communities (VCs) with innovative atmospheres have recently emerged; thus, people often create and publish novel content, such as original and surprising opinions, comments, articles and pictures, in VCs to shape a unique self-image and to attract more attention from others (Carmel *et al.*, 2012; Brake, 2014; Schwämmlein and Wodzicki, 2012). Such content is known as novel posting, which describes a manner of posting by which members create and post novel content in VCs. Therefore, novel posting can be seen as a creative behavior; in addition, novel posting contributes to members' sense of individuality and establishes how they differ from other group members; thus, it can also be regarded as an individualized behavior (Postmes *et al.*, 2005). Individuality refers to personal characteristics that differentiate an individual from other people or things[1].

Although novel posting is a universal phenomenon and a primary means of member participation in VCs, little research has investigated why this phenomenon is so



widespread and what social and psychological benefits novel posting can offer to VC members. Having a sense of belonging is also a basic human social or psychological need, and it is considered an important factor for social well-being and mental health (Zhao *et al.*, 2012). "Sense of belonging" can be defined as the formation of a shared group identity and thus implies that individuals perfectly integrate or assimilate themselves into virtual groups. Therefore, sense of belonging plays an important role in VC members' attachment and loyalty to VCs, both of which play vital roles in VC development (Lin, 2008). Can members attain a sense of belonging based on their novel posting?

In the social identity tradition, sense of belonging means the salience of one's social identity; in this case, a group member's sense of who he/she is, at least in part, is formed by the group to which he/she belongs (Hornsey and Jetten, 2004). Thus, a group member's self-definition is partly based on the collective attitudes, memories and behaviors drawn from the group, which lead the member to perceive similarities between him/herself and other group members (Hornsey and Jetten, 2004). Sense of belonging strengthens the perceived similarities between group members, whereas novel posting highlights the differences between a member and other group members. Therefore, conflict may arise between novel posting and sense of belonging; that is, novel posting may not be conducive to the formation of a sense of belonging. In fact, previous research has suggested that similarity is an important antecedent of sense of belonging (Easterbrook and Vignoles, 2013) and that difference tends to negatively influence social cohesion, community and affective outcomes (Milliken and Martins, 1996), thus impeding the emergence of sense of belonging (Hornsey and Jetten, 2004).

However, in recent years, some studies have argued that individualized behavior may also foster a shared identity and trigger positive outcomes in this context, where individualization is enabled and encouraged (Jans *et al.*, 2011). Although these studies have not revealed the mechanism behind the creation of sense of belonging based on individualized behavior, which requires further research, these studies have suggested a positive relationship between individualized behavior and sense of belonging. Indeed, VCs encourage creative and novel behaviors, and if novel posting has social and psychological effects (i.e. social interaction and self-esteem) for members, then these social and psychological effects that some studies have proposed may further encourage a sense of belonging (Huemer *et al.*, 2004; Ainhoa, 2007).

Novel posting is a common phenomenon in VCs, but little research has focussed on the social and psychological outcomes of novel posting. This study thus aims to construct a research model to identify the social and psychological benefits of novel posting for VC members, particularly the formation of a sense of belonging based on novel posting. The research model from novel posting to sense of belonging describes individuals' processes of integrating themselves into virtual groups.

Literature review and hypotheses

A few studies on knowledge contributions (i.e. posting) in VCs have reported that individuals' social and psychological motivations for knowledge contributions include reputation, relationship continuity, reciprocity (Hsu, 2015; Wang and Lai, 2006) and online attachments (such as frequent social interactions) (Ma and Yuen, 2011). However, the knowledge that individuals contribute to VCs is not necessarily novel or original; it is sometimes general or commonplace. Thus, these studies focussed on the social and psychological outcomes derived from the quantity of knowledge contributions, not those derived from the novelty of knowledge contributions.

Novelty refers to the originality of individuals' contributed knowledge and its distinctiveness from that of others; therefore, novel knowledge contributions may lead to the contributor's sense of individuality, and the social and psychological outcomes of novel knowledge contributions may be very different from those of non-novel knowledge contributions. Some studies have indicated that the major motivations for creating "content" in blogs are "expressing myself creatively," "sharing practical knowledge" and "influencing the way other people think" (Brake, 2014). However, these studies have not revealed the deeper social and psychological benefits underlying these motivations, some of which may be unexpected but very beneficial. In the social identity theory tradition, people are assumed to join a group primarily to meet their social needs (such as social interaction) and psychological needs (such as self-esteem) (Ellemers *et al.*, 1999; Ainhua, 2007). In fact, a VC can be seen as an online social network characterized by social interaction ties (Chiu *et al.*, 2006; Ren *et al.*, 2012; Hsu, 2015). In addition, operating based on user-generated content, a VC can also be regarded as a work group or a work organization in which users produce content (Yua and Chub, 2007; Velasquez *et al.*, 2014; Chu and Kennedy, 2011). Therefore, when participating in VCs, members may primarily pursue social interactions and a sense of achievement (i.e. self-esteem). Consequently, novel posting, as a primary means of participation, is expected to provide the social and psychological effects of social interaction and self-esteem for group members, which may further foster their sense of belonging (Jones and Volpe, 2011; Easterbrook and Vignoles, 2013). Indeed, by investigating previous studies, we find that interpersonal attachments and an esteemed identity are the two main elements underlying the formation of sense of belonging (Baumeister and Leary, 1995; Ainhua, 2007; De Cremer and Oosterwegel, 2000). All these studies provide the theoretical foundation for model construction and mediating variable selection. The theoretical model is shown in Figure 1.

Social interaction ties

Social interaction is a basic social human need. By interacting socially, people can reduce loneliness, seek social support and build friendships (Ma and Yuen, 2011; Chua and Balkunje, 2013). The concept of social interaction ties comes from the theory of social capital. Social interaction ties comprise the structural dimension of social capital and refer to the structural links between members and the extent to which they are connected to one another within a social network (Wang and Lai, 2006).

Social interaction ties reflect the fundamental form of social capital and perfectly depict the interactive features of VCs as social networks (Hsiao and Chiou, 2012).

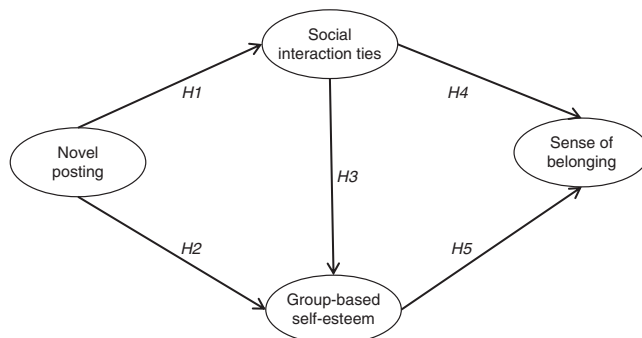


Figure 1.
Research model

Moreover, social interaction ties indicate frequent social interactions (or close interpersonal bonds) and can thus strongly satisfy the social needs of VC members. Therefore, social interaction ties represent a social benefit and are more suited than social capital for use in the current study. The current study is consistent with Hsiao and Chiou (2012), who used social interaction ties rather than social capital to study the influence of the former on VC loyalty.

People post novel content in VCs to attract attention and to elicit responses. Indeed, novel posting implies that group members' opinions and thoughts are novel or different from those of others and may thus initiate more discussion between group members. Carmel *et al.* (2012) argued that novelty may be the most effective predictor of the attractiveness of posting content; thus, novel posts often attract a large number of responses. Moreover, to attract more attention and to elicit more responses, posters often actively reply to respondents or even cater to them; thus, many social interactions emerge among the original posters and the respondents that contribute to the close relationships (i.e. social interaction ties) among them. Indeed, people are generally willing to communicate and interact with respondents because of their social and affiliation needs (Baumeister and Leary, 1995). Although novel posting highlights the differences among members, they do not pay more attention to their differentiation or isolation from others and instead attach great importance to social interactions, which contribute to the social relationships among members (Hsu, 2015). Therefore, an individual can build and maintain social interactions and close social relationships with others through novel posting. Based on the reviews above, we hypothesize the following:

- H1. A member's novel posting positively affects his/her social interaction ties in the VC.

Group-based self-esteem

Social identity theory assumes that people strive to enhance their positive feelings about their self-image and self-esteem through group membership (Ellemers *et al.*, 1999). Self-esteem can be classified as collective and personal (Luhtanen and Crocker, 1992).

As one form of collective self-esteem, group-based self-esteem refers to the degree to which a group member believes him/herself to be worthy of and important to a social group (Kanning and Hill, 2012; Luhtanen and Crocker, 1992). Only this form of collective self-esteem is obtained from individuals' contributions to a group and is significant in the VC context; therefore, it is well suited for use in our study. Similarly, Bagozzi and Dholakia (2002) also employed group-based self-esteem to examine members' sense of collective self-esteem in VCs.

A VC can also be regarded as a work group in which group members contribute creative ideas and thoughts to the group through novel posting. Therefore, novel posting can be regarded as a creative act and a task behavior, and the achievement based on these acts and behaviors contributes to members' self-esteem levels. If a member's contribution is more novel, it is often more attractive to group members and may receive more responses, thereby triggering more of a sense of achievement in the poster's mind. Hence, more novelty may foster more group-based self-esteem. Although group-based self-esteem, in turn, can also influence members' posting behaviors, this possibility does not undermine the legitimacy of a forward causal relationship between novel posting and group-based self-esteem. In VCs, members' importance to the VC is not given in advance; thus, the members perceive their importance to the VC and obtain

group-based self-esteem only after contributing to the VC (specifically, through novel posting). Based on these reviews, we hypothesize the following:

H2. A member's novel posting positively affects his/her group-based self-esteem in the VC.

The degree of social interaction is regarded as a mark of a VC's vitality, and many social interactions that an individual initiates can be viewed as a type of contribution to the VC. "Social interaction ties" refers to many social interactions between individuals. Therefore, an individual's social interaction ties with others suggest that they have many social interactions with others or receive many responses from others. People with many social interactions or responses may feel good and have a sense of task/work achievement, which may enhance their self-esteem (Pierce and Gardner, 2004). Therefore, we hypothesize the following:

H3. A member's social interaction ties positively affect his/her group-based self-esteem in the VC.

Sense of belonging

"Sense of belonging" has been defined as "the experience of involvement in a group so that individuals feel themselves to be an integral part of the group along with the emotional significance of this identity" (Zhao *et al.*, 2012). According to this definition, affective commitment may be a very important aspect of sense of belonging. In fact, for group members, a strong sense of belonging is certainly accompanied by affective commitment to the group (Zhao *et al.*, 2012; Ellemers *et al.*, 1999). However, a sense of belonging extends beyond the meaning of affective commitment; it also implies the salience of a social identity (Ellemers *et al.*, 1999).

VC members are anonymous and often geographically distant from one another. Thus, the mitigation of that sense of distance and members' integration into a close collective play important roles in generating members' sense of belonging. Social interaction is the best method of achieving integration (Huemer *et al.*, 2004). Social interaction ties mean frequent social interactions among group members, which help them form a sense of familiarity with one another, thereby narrowing their psychological distance (i.e. fostering a sense of integration; Ren *et al.*, 2012) and further generating their sense of belonging (Zhao *et al.*, 2012). In addition, based on social interactions and close ties, a member can establish positive personal relationships with other members, resulting in affective connections between them. Because members in a VC are anonymous and unseen, all members with whom an individual is familiar or in close contact represent the group in the individual's mind. Therefore, the individual's affective commitment to these members indicates an affective commitment to the group as a whole. Thus, affective commitment to certain members within a group will lead to affective commitment to the entire group (Ren *et al.*, 2012), which is regarded as an important component of sense of belonging. Finally, an individual's participation behavior might act as a sign of membership (Ashforth *et al.*, 2008). Social interaction in a VC is the primary way of participating in the community and thus might contribute to individuals' perceptions of their membership and sense of belonging. Based on the above reviews, we hypothesize the following:

H4. A member's social interaction ties positively affect his/her sense of belonging to VC groups.

Ainhoa (2007) has argued that individuals always seek to obtain a positive self-image by belonging to a social group. As De Cremer and Oosterwegel (2000) have indicated,

people with high collective self-esteem are more willing to accept their esteemed social identity, and collective self-esteem is positively related to members' sense of belonging. Group-based self-esteem is a primary form of collective self-esteem in VCs; thus, group-based self-esteem may contribute to members' sense of belonging to their group (Ainhoa, 2007). Therefore, we hypothesize the following:

H5. A person's group-based self-esteem positively affects his/her sense of belonging to VC groups.

Sense of
belonging
based on novel
posting

Research methodology

Sampling and data collection

To test the research model and the hypotheses above, this study conducted an online survey via Baidu Post Bar (www.tieba.baidu.com), which was launched in 2003 and is now the largest online forum in China[2]. Baidu Post Bar falls into the category of "a community of common interest or information exchange" (Chua and Balkunje, 2013). People spontaneously gather to discuss common interest topics in Baidu Post Bar. By early 2015, more than eight million groups and subgroups had been created in Baidu Post Bar, such as the geography group, the Chinese geography group, the National Basketball Association group and the LeBron James group, with more than one billion members active in these groups (see footnote 2). Baidu Post Bar is the most popular and comprehensive online forum in China (see footnote 2); thus, the data collected from this community have great research value and can provide generalizable findings. We obtained the permission of Baidu Post Bar moderators to post a link to our online questionnaire. The data collection began in November 2014 and lasted two months. To avoid a self-selection bias, we randomly posted the questionnaire link in 28 groups on Baidu Post Bar that cover all the main group types. We dropped 53 invalid questionnaires and obtained a total of 359 usable responses. Table I shows the respondents' demographic information.

Variables	Items	%
Gender	Male	76.6
	Female	23.4
Identity	Middle school student	6.9
	High-school student	18.2
	Undergraduate	45.7
	Postgraduate	3.4
	Worker	25.8
Age (in years)	< 15	5.3
	16-20	37.5
	21-25	39.6
	26-30	9.2
	31-40	6.7
	> 40	1.7
Membership duration	Less than six months	17.3
	Approximately six months	17.1
	Approximately one year	21.3
	Approximately two years	26.9
	Approximately four years	6.2
	More than four years	11.2

Table I.
Respondents'
demographic
information

Measures

All measurements were adapted from scales validated by previous studies. To improve the validity and comprehensibility of the measurements, we conducted a focus group interview to verify and refine the questionnaire. The group included two professors and three senior doctoral students who had conducted research in online behavior. The measurements were also pretested by students who often participated in Baidu Post Bar to ensure that the wording of the measurement items and the translation were logically consistent, contextually relevant and comprehensible.

All items and their references are shown in Table II. All items were measured using five-point Likert scales, ranging from “strongly disagree” to “strongly agree.”.

Data analyses

Structural equation modeling was used to test the research model shown in Figure 1, and we employed AMOS 21.0 and MPLUS7.0 for this purpose.

Results*Measurement model*

All the overall fit indices for the measurement model performed well: $\chi^2/df = 1.707$; GFI = 0.955; AGFI = 0.930; CFI = 0.984; TLI = 0.979; and RMSEA = 0.044. We used confirmatory factor analysis (CFA) to examine the measurement model's construct reliability and validity. First, the construct reliability was assessed using Cronbach's α 's and composite reliability. As Table III shows, the Cronbach's α values range from 0.825 to 0.904, and the composite reliability values range from 0.829 to 0.905, indicating acceptable reliability (Zhao *et al.*, 2012). The convergent validity was then measured using the average variance extracted (AVE) from the constructs and the factor loadings. As Table III shows, all AVE values are significantly higher than 0.5, suggesting adequate convergent validity. In addition, we performed factor analysis

Variables	Measurement items	Standard loadings
<i>Novel posting (items adapted from Carmel et al., 2012; Sethi et al., 2001)</i>		
NP1	The content of my posts is novel	0.793
NP2	My posts are original	0.814
NP3	The content of my posts is new	0.751
<i>Social interaction ties (items adapted from Chiu et al., 2006)</i>		
SIT1	I maintain close relationships with certain members of this group	0.904
SIT2	I frequently communicate with certain members of this group	0.892
SIT3	I know certain members of this group personally	0.820
<i>Group-based self-esteem (items adapted from Luhtanen and Crocker, 1992)</i>		
GBSE1	I am a valuable member of this group	0.812
GBSE2	I am important to this group	0.803
GBSE3	I have no contribution to this group ^a	0.870
<i>Sense of belonging (items adapted from Lin, 2008; Zhao et al., 2012)</i>		
SOB1	I see myself as an integral part of this group	0.902
SOB2	I do not have a sense of belonging to this group ^a	0.773
SOB3	I feel emotionally connected to this group	0.816
Note: ^a Reverse-scored items		

Table II.
Measurement items
and standard
loadings

using CFA. Table II shows the item loadings for the corresponding constructs. All item loadings were greater than 0.7, which is far above the acceptable level (Chiu *et al.*, 2006). Finally, discriminant validity was investigated by comparing the square roots of the AVE values for the individual constructs with the shared variances between the constructs. As shown in Table IV, the square roots of the AVE values for the individual constructs (the diagonal elements) are all significantly greater than the shared covariance corresponding to the individual constructs, thus confirming significant discriminant validity (Zhao *et al.*, 2012).

Data collected through a single self-reported measures are susceptible to common method variance (CMV). To avoid CMV, we first set some reverse items in the survey measurements, as shown in Table II (Podsakoff *et al.*, 2003). We then used principal component factor analysis to test CMV, and no general factor exceeded the acceptable range (Podsakoff *et al.*, 2003). Finally, we also used the one-factor model approach to examine CMV (Harris and Mossholder, 1996). We connected all items to one latent variable and built a one-factor measurement model, and we then tested this model using CFA. The overall fit indices of this one-factor model performed poorly: GFI = 0.574; AGFI = 0.452; CFI = 0.564; TLI = 0.502; $\chi^2 = 1,824.298$; $df = 119$; and $\chi^2/df = 15.330$. All indices were far outside of the acceptable range and that of the original model. Together, these results indicate that CMV did not affect the interpretation of our present findings (Podsakoff *et al.*, 2003; Harris and Mossholder, 1996).

Structural model

We tested the research model using AMOS 21.0. All the overall fit indices of the structural model performed well: $\chi^2/df = 2.040$; GFI = 0.943; AGFI = 0.917; CFI = 0.975; and RMSEA = 0.052. They were all significantly above the acceptable levels. All the hypotheses were subsequently tested, and the findings are shown in Figure 2.

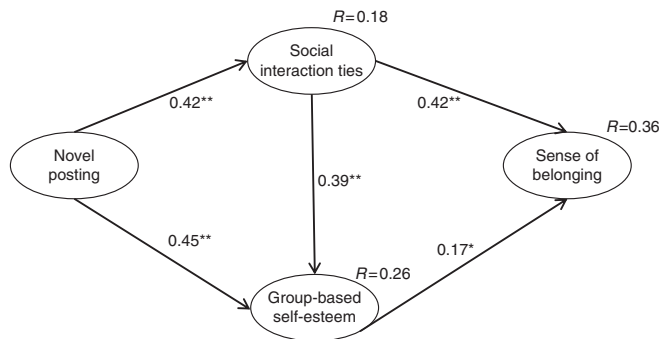
All the path coefficients are significant (at the level of $p < 0.01$ or $p < 0.05$), indicating that all the hypotheses are supported. The explained variances of social interaction ties, group-based self-esteem and sense of belonging are 18, 26 and 36 percent, respectively.

Table III.
Cronbach's α 's,
composite
reliabilities and AVE
values of the study
variables

Constructs	Cronbach's α	Composite reliability	AVE
Novel posting	0.825	0.829	0.619
Social interaction ties	0.904	0.905	0.762
Group-based self-esteem	0.867	0.868	0.687
Sense of belonging	0.868	0.871	0.692

Table IV.
Correlations between
the latent constructs

Constructs	NP	SIT	GBSE	SOB
Novel posting (NP)	0.787			
Social interaction ties (SIT)	0.415	0.873		
Group-based self-esteem (GBSE)	0.598	0.572	0.829	
Sense of belonging (SOB)	0.348	0.553	0.464	0.832

Figure 2.
Model testing results

Notes: * $p < 0.05$; ** $p < 0.01$

Mediation effects

The mediation effect analysis model is a multiple mediation model. Bootstrapping is the most powerful and reasonable method of obtaining confidence limits for specific indirect effects under most conditions (Preacher and Hayes, 2008). Therefore, this study used bootstrapping to test the multiple mediation model via MPLUS7.0 software. We investigated the indirect effects of novel posting on sense of belonging through social interaction ties and through group-based self-esteem, and we then performed a contrast analysis of these indirect effects (Preacher and Hayes, 2008). The test results are shown in Table V.

Table V shows that there is 95 percent likelihood that the indirect effect of novel posting on sense of belonging through social interaction ties ranges from 0.100 to 0.203; the estimated effect is 0.148. Because 0 does not lie between the lower and upper limits, we can conclude that the indirect effect is significant. Likewise, the indirect effect of novel posting on sense of belonging through group-based self-esteem is also significant. An examination of the contrast of these two indirect effects (C1) shows that the indirect effect through social interaction ties is significantly greater than that through group-based self-esteem because 0 does not emerge between the lower and upper limits (0.004, 0.155).

Discussion and implications

Conclusion and research contributions

The results of our study show that novel posting can foster social interaction ties and group-based self-esteem, which further contribute to the emergence of members' sense of belonging in VCs. These social and psychological outcomes of novel posting reflect

Table V.
Indirect effects of novel posting on sense of belonging through social interaction ties and group-based self-esteem

	Point estimate	Product of coefficients		Bootstrapping BC 95% CI	
		SE	Z	Lower limit	Upper limit
Social interaction ties (SIT)	0.148	0.026	5.649	0.100	0.203
Group-based self-esteem (GBSE)	0.069	0.030	2.322	0.015	0.132
C1 (SIT vs GBSE)	0.079	0.038	2.082	0.004	0.155

Notes: C1, contrast of the indirect effects through SIT and GBSE; SE, standard error; BC, bias-corrected confidence intervals. 5,000 Bootstrap samples

individuals' processes of integrating themselves into a virtual group. Novel posting highlights the differences among members, which were considered unfavorable for the integration of individuals into a group (Hornsey and Jetten, 2004), but some studies in recent years have indicated that in some settings, there may be positive relationship between difference and sense of belonging (Jans *et al.*, 2011). Hornsey and Jetten (2004) argued that a high level of similarities with others may threaten members' unique self-concepts; thus an appropriate level of differences from others may be conducive to the members' willingness to belong to their groups. Jans *et al.* (2011) also suggested that individual differences are beneficial for groups and can foster belongingness. However, these studies failed to reveal the deeper mechanism behind the positive relationship between difference and sense of belonging. By investigating the model of sense of belonging formation based on novel posting in VCs, our study has further identified the deeper influential mechanism of individual difference on sense of belonging from the social and psychological perspectives. Group members provide novel content to VCs primarily to attract others' attention, to initiate more social interactions and to obtain a sense of self-esteem rather than to deliberately attempt to isolate themselves from others. Therefore, novel posting does not impede the process of group members' integration into the group or the formation of their sense of belonging.

First, novel posting is attractive to VC members and can significantly aid in initiating social interactions and in fostering ties between members. Carmel *et al.* (2012) have argued that more novel the posts are, more responses they receive. We further indicated that VC members, based on frequent responses, can build stable social interaction ties with others. Hsu (2015) has indicated that knowledge contributions are conducive to relationship continuity. Although novel posting stresses creativity and differences, it is still a way for members to contribute knowledge, and we found that it is also conducive to relationship maintenance.

Second, novel posting can be viewed as a task behavior and thus can contribute to members' group-based self-esteem. Wang and Lai (2006) and Hsu (2015) indicated that individuals contribute knowledge in VCs to obtain a good reputation. Our study considered that group-based self-esteem makes a member perceive him/herself as a highly valued member and may be a deeper psychological element underlying his/her reputation.

Third, social interaction ties play a significant mediating role in the emergence of a sense of belonging. This finding is consistent with the study of Easterbrook and Vignoles (2013), who confirmed that, in interpersonal networks, interpersonal bonds are important factors in the path toward belonging. In their study, the concept of interpersonal bonds is very similar to that of social interaction ties; however, the groups that they investigated are not virtual groups. In addition, as the results show, the indirect effect through social interaction ties is significantly greater than the other indirect effect. This result is likely due to the fact that individuals in VCs (because of their anonymity and geographical distance) feel a sense of distance and isolation from other members. Therefore, members are only able to become familiar with one another and experience a sense of community, which are the most important conditions for forming a sense of belonging (Ren *et al.*, 2012), through social interactions. This is consistent with the 2004 study of Huemer *et al.*, who investigated virtual organizations and indicated that social interaction represents the social and psychological tie binding employees to the organization, especially when employees are geographically dispersed.

Finally, group-based self-esteem is one form of collective self-esteem and also plays a significant mediating role in the process of creating a sense of belonging. This finding is consistent with the social identity tradition: an evaluative factor underlies the

process of forming a sense of belonging, which refers to the salience of social identity (Ainhoa, 2007). This traditional opinion implies that people always seek to obtain a positive collective self-esteem based on their belonging to a group. Our study confirmed and developed this idea in the context of VCs.

Managerial implications

Novel posting, social interaction ties and self-esteem, particularly sense of belonging, are vital to maintaining VC membership and to developing VCs; hence, this study also has several important practical implications for VC operators and organization managers.

First, VC operators should focus on differentiating between irrational posts and novel posts. Irrational behaviors, such as posts that violate social norms, should be removed, whereas novel posting should be encouraged. Novel posts promote the content of VCs by attracting new members and retaining current members. Although novel posting highlights the differences among individuals, which may be considered unfavorable for the individual's integration into a collective, VC operators can further promote the individual's sense of belonging by creating favorable conditions for individuals to generate frequent social interactions and to develop a sense of group-based self-esteem. In addition, according to this guidance, organization managers can promote the employees' sense of belonging and organizational cohesion when using social media as a communication tool, especially when working through a VC (Davenport and Daellenbach, 2011).

Second, because social interaction ties constitute an important factor that reflects the vitality of VCs and play the most significant mediating role in the formation of sense of belonging, VC operators should create attractive theme groups and manufacture attractive topics to promote interactions within these groups, thereby strengthening the degree of social interaction ties within such communities.

Finally, because members also pursue self-esteem in VCs, VC operators could offer virtual rankings as social encouragement to members who post content and interact with others. Meanwhile, motivating factors and rewards can strengthen members' self-esteem. For example, the virtual rankings that VC operators provide can serve as a status symbol that enhances members' self-esteem.

Limitations and future research

Our study has several limitations. First, this study primarily presents a theoretical exploration of this topic, and the survey was conducted in only one VC, in which members discuss their common interests. Our findings might not apply to other types of VCs, such as relationship-based VCs. Therefore, future research should test the current research model with different types of VCs to identify the differences among them and to extend the model. Second, because of the small amount of variance explained, other unidentified factors might exist, such as online community experience and entertainment, which could be derived from novel posting and might further strengthen members' psychological feelings and then influence their sense of belonging. Finally, in addition to sense of belonging, social interaction ties and self-esteem may generate other benefits for VCs, such as fostering member loyalty to VCs; furthermore, self-esteem may generate additional benefits, such as positive effects on individuals' mental development. These topics may be interesting avenues to explore in future research.

Notes

1. The reference for this definition is The Free Dictionary (see www.thefreedictionary.com/individuality).
2. The data are available at the Baidu Baike website (see <http://baike.baidu.com/view/2185.htm>).

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