

# Network Overlap and Network Blurring in Online Social Networks

Nan (Andy) Zhang<sup>1</sup> and Chong (Alex) Wang<sup>2</sup>

<sup>1</sup>*Department of Computer Science and Information Systems, University of Jyväskylä, Agora, 40100, Jyväskylä, Finland*

<sup>2</sup>*Department of Information Systems, City University of Hong Kong, 83 Tat Chee Avenue, Hong Kong, China*

**Keywords:** Social Networking Site, Online Community, Affective Commitment, Network Overlap, Network Blurring.

**Abstract:** Online communities and the online social networks embedded become a prominent medium for social interactions. The success of social media depends on users' willingness to continue investing their time and efforts in the absence of economic rewards, making psychological attachment critical to online communities. While prior studies identify that members do develop psychological commitment to online communities, why and how the commitment arises remain underexplored. This study focuses on the relationship between network overlap, a common feature of online social networks, and affective commitment to an online community. Drawing on the commitment theory and social network boundary theory, we argue that the effect of online/offline network overlap is partially mediated by network boundary blurring. Meanwhile, contrary to industrial wisdom, the direct impact of network overlap on commitment is negative. Our empirical study supports our proposal. It indicates that it is critical to help users integrate online and offline social networks. Without success social network boundary blurring, high level of network overlap may backfire.

## 1 INTRODUCTION

As one of the most important social media applications, social networking site (SNS) has revolutionized how media contents are created and consumed and has been among the most mentioned buzzword in the business in recent years. However, as the initial flame cooling down, business critiques began to question about the sustainability of SNSs in the absence of formal ways to award users for continuous participations. Some even argue that online social networking and online communities may only be something that matter hugely until, very suddenly, they don't matter at all (Hirschorn, 2007). A recent report indicates that Facebook is losing teen audience (Tech Times, 2015) and we see many once hot SNSs falling. For SNSs to survive and match the hype, one of the major challenges is to maintain active users' participations. Without the right mechanism to sustain online activities, SNSs will inevitably become something "hot today and gone tomorrow" (Knowledge@Wharton, 2006).

Supported by social networking functions, users form online communities in SNSs. Through online social networking activities such as sharing personal experiences and opinions, playing online games, and providing and receiving social supports, SNSs users

generate psychological attachment (affective commitment) to their online communities. Researchers identify that this affective commitment can influence SNSs users' post-adoptive usage and contribution behaviors. For example, drawing on commitment theory, Bateman et al. (2011) explain how commitment to an online community influences the likelihood that a member will engage in particular behaviors. Similarly, Tsai and Bagozzi (2014) identify a relationship between anticipated emotions and behavioral desires in an online community. However, it is still not clear how the affective commitment is developed in online communities.

Meanwhile, recognizing the bonding power of offline, strong-tie social connections, practitioners make significant efforts to bring current users' offline friends to the online community, hoping that it will make online social networking experiences more engaging. This strategy significantly increases the overlap between online and offline social networks. Despite the prominence of overlap between online and offline networks, few study tried to explore the relationship between network overlap and user's commitment to online communities (Zhang and Venkatesh, 2013).

To fill these gaps in our understanding and shed lights on the effectiveness of bringing in offline social

connections, we study the relationship between network overlap and user commitment to online communities in the context of SNS. Based on commitment theory and network boundary theory, we argue that the overlap between online and offline social networks have both a direct and a mediated effect on affective commitment. While the mediated effect, through network blurring, is positive, the direct effect of network overlap is negative, contrary to the popular belief. Without successfully blurring the boundary between the two networks, bluntly increasing network overlap may result in confusion and a utility focus in the usage of online SNS tools, which impedes the development of affective commitment and hurt continuous participations on SNSs. Our empirical study supports this theoretical proposal and confirms a partially mediated effect of network overlap on affective commitment to an online community.

## 2 THEORETICAL BACKGROUND

Existing research has significantly enhanced our understanding about users' behaviors in SNSs. For example, the effects of moral beliefs (Xu et al., 2015), homophily between online peers (Gu et al., 2010) and reputation (Tang et al., 2014) have been identified. However, we would like to argue that the existing models failed to capture an important aspect of online communities, that is, the social network embedded in an online community is formed by peers from both offline and online worlds. Such a network overlap can influence the focal people's behaviors (Zhang and Venkatesh, 2013). Thus, drawing on commitment theory and boundary theory, we will go a step further to focus on the relationship between network overlap and user commitment to online communities.

### 2.1 Affective Commitment

Commitment is individuals' enduring desire to stay in a community or an organization. It is agreed that individuals' commitment to a community can affect their intention to be a part of the community (Wasko and Faraj, 2005).

Commitment theory was used to explain why volunteers at non-profit organizations varied in their level of dedication (Becker, 1960). In SNSs, user's usage of the services is primarily voluntary rather than mandatory, and switching from one website to another similar site is relatively easy and involves low

costs (Brynjolfsson and Smith, 2000). Thus, commitment theory is an appropriate framework for investigating users' voluntary behaviors in SNSs (Bateman et al., 2011). In the context of SNS, the type of commitment that a member may have to an online community is affective.

Affective commitment is defined as "the degree to which people experience an emotional attachment with their organization" (Meyer and Allen 1991, p. 67). Members who have developed a strong affective commitment to an community generally like that community and identify with it, are more likely to desire to be a part of conversations that occur in that community, and therefore inclined to stay in (Bateman et al., 2011). Despite the importance of affective commitment, its antecedents in the context of SNS are not clear. Therefore, we will identify the factors that can influence the development of the affective commitment in SNSs.

### 2.2 Social Network Boundary

Boundaries occur at points of discontinuity in space, time, or function. Such a discontinuity is a boundary if there is control or regulation of transactions across it (Miller et al., 1978). From the social psychology perspective, social network boundaries reflect an individual's perception of the differences between different social environments (Morrison et al., 1985).

In the offline world, people employ a variety of mechanisms to regulate their social networks boundaries. Verbal and non-verbal communications, territoriality behaviors and personal space creations are identified as boundary-control mechanisms (Altman, 1975). People can use body language to block themselves from unwanted contacts. They can also build up physical barriers to mark, defend and limit others' access to a network. Further, by altering the distance and angle of orientation from others, the individual creates an intimate zone reserved to avoid intrusions from strangers. In general, different social networks are separated from each other in the offline world.

When social interactions are moved to SNSs, the situation is changing. Some boundary regulation mechanisms are not as efficient as it used to be in offline world. Social network boundaries in the context of SNSs are blurring. Online network boundaries are obscure due to the absence of temporal and spatial discontinuity helps to achieve absolute separation (Pierce et al., 2001). Intimacy and reserve are hardly secured as online discussions and comments are mostly publicly observable. The maintaining of network boundaries is more

challenging due to the rapid diffusion of information among online peers. Such a blurring of network boundary will influence the development of the affective commitment to an online community.

### 3 THEORY DEVELOPMENT

Bateman et al. (2011) identify a positive relationship between affective commitment and users' intention to stay in an online community. However, it is not clear in the literature how online social networks help to produce the affective commitment. Drawing on the network boundary perspective, we propose that the overlap between online and offline social networks have both a direct and a mediated effect on affective commitment. While the mediated effect, through network blurring, is positive, the direct effect of network overlap is actually negative. Figure 1 shows our conceptual model.

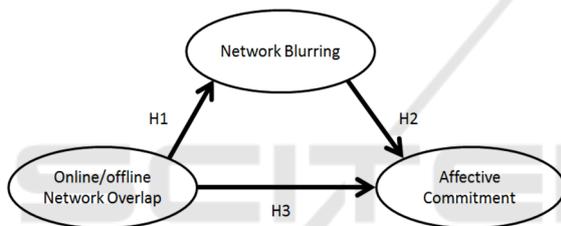


Figure 1: Conceptual model.

#### 3.1 Online/Offline Network Overlap

Online/offline network overlap is defined as extent to which a focal SNS user's peers in his/her online social network are also peers in his/her offline social network. It is an objective description of the composition of the focal user's online network.

Online communities are extensions of people's offline social relationships. On the one hand, people develop new friendship online. On the other hand, they tend to communicate offline acquaintances on the websites as well. Meanwhile, SNSs vendors also use the strategy to facilitate a quick diffusion of their services by encouraging users to send invitation emails to their offline peers to let them join the SNS. As a result, part of the peers in the focal users' online community is also friends in their offline networks. Thus, an overlap between the focal user's online and offline social networks is generated.

#### 3.2 Network Blurring

While online/offline network overlap reflects the composition of a focal SNS user's online social networks, we introduce another construct, network blurring, to describe the user's perception of the similarities between online and offline social networks. Specifically, network blurring is defined as extent to which a focal SNS user believe that his/her online and offline social networks are the same or inseparable.

#### 3.3 Affective Commitment, Network Overlap and Network Blurring

Since most behavior is closely embedded in networks of social relations, the structure of an individual's social network will influence the individual's behavior (Reagans and McEvily, 2003). In the current context, network overlap, as a reflection of the pattern of an individual's online social network, will impact his/her affective commitment to an online community. The influences are two folds. Depending on the focal user's perception of the similarities between the two networks, the impact could be either positive or negative. Specifically, network overlap could have both a mediated and a direct effect on affective commitment. While the mediated effect, through network blurring, is positive, the direct effect is negative

Network overlap could have positive effects on SNSs users' affective commitment because of two reasons. First, the focus of trust belief can shift from those offline peers to the online community (Meyer et al. 1998). People trust their offline peers more than their pure online peers in general due to the better ability of face-to-face communications in terms of trust-building cues transmission (Kumar and Benbasat, 2006). When the network overlap is high, due to the existence of trustful offline peers, the online community becomes a more trustful space for the focal user. In such an environment, it is easier for the focal user to develop affective commitment to the online community.

Second, the focus of commitment can shift from those offline peers to the online community (Meyer et al., 1998). In the current context, when the network overlap is high, traditional boundaries between online and offline network is blurring. The two networks can be integrated together. Therefore, people may shift the focus of the affective commitment from their offline communities to the online communities. When the overlap is increasing, the proportion of offline

peers is increasing, and consequently, the possibility of the commitment focus shifting is larger.

The focus of trust belief and affective commitment can shift from offline peers and communities to an online community. However, the transference would be hard if the focal user thinks that the two communities are different or separable. The user may use some methods to maintain the boundary (e.g. group peers into different categories). Due to the approach, the transference of trust belief and affective commitment will be blocked. Thus, the positive effect from online/offline network overlap on affective commitment is mediated by network blurring.

The degree of network overlap can increase the degree of network blurring. Conversations in SNSs are not limited by temporal and spatial separations. SNSs therefore free individuals from the geographical boundaries. When peers start to communicate to each other in both online and offline environment, the natural boundary of online and offline network is blurring. The focal individual's perception of the similarity between these two networks is therefore increasing.

*H1: The degree of online/offline network overlap increases the focal user's network blurring.*

It would be easier for members to shift the focus of their trust belief and affective commitment from one to another if they do not view the two organizations as fundamentally different (Thompson, 2001). With the same logic, if the degree of network blurring is high, he/she may shift the focus of trust belief and affective commitment from offline peers and communities to online communities as well. In this case, it is easier for the user to either shift the existed affective commitment to the online community or develop new one to the online community.

*H2: The degree of network blurring increases the focal user's affective commitment to the online community.*

When the positive impact of network overlap on affective commitment is mediated by network blurring, the direct effect is negative. When most of peers in an online network come from the focal user's offline network, the online community becomes a complementary communication tool of the offline network. Although, people may communicate with each other predominantly online, their relationships are still based on the offline contexts (e.g. classmates, relatives and colleges). In this case, high degree of network overlap could result in a feeling of triviality of the online community. Online community becomes

a communication platform or maintaining tool for different relationships embedded in the offline network. Thus, the high degree of overlap may inhibit the focal user from forming affective commitment to the online community.

*H3: Online/offline network overlap decreases the focal user's affective commitment to the online community.*

## 4 METHODS AND PROCEDURE

Items for affective commitment are adopted from Allen and Meyer (1996) with modifications for the SNSs context where needed. Online/offline network overlap is measured by the questions like "I knew most of my friends in my virtual community before I joined this website." Network blurring is measured by the questions like "It is often difficult to tell the difference between my online social network and my offline social network."

An online survey is carried out among the students from a Hong Kong based university. We select students enrolled in a course in the business school. The online survey lasts for two weeks and two reminders for participation are sent out during the period. 165 out of 344 students complete the survey. The response rate is 48%.

## 5 DATA ANALYSIS AND RESULT

### 5.1 Measurement Model Assessment

We use covariance-based structural equation modeling in AMOS to test our measurement model. The fit statistics for the measurement model ( $\chi^2=60.15$ ,  $df=32$ ,  $\chi^2/df=1.88$ ,  $RMR=0.10$ ,  $GFI=0.93$ ,  $NFI=0.93$ ,  $CFI=0.96$ ,  $RMSEA=0.07$ ) indicate good fit. Further, the scales exhibit good reliability (composite reliabilities range from .746 to .906), good convergent validity (all item loadings are above 0.7 and the AVE is greater than 0.5 for all constructs), and good discriminant validity.

### 5.2 Results of Hypotheses Testing

First, we follow Baron and Kenny's (1986) causal step approach to test our hypotheses in regressions.

The results suggest that the effects from online/offline network overlap on affective commitment are partially mediated by network blurring (see Table 1).

Table 1: Regression results.

	Model 1	Model 2	Model 3	Model 4	Model 5
IVs	Controls	NO→AC	NO→NB	NB→AC	Full Model
Age	.100	.097	.206**	.031	.019
Gender	-.109	-.101	-.031	-.104	-.089
SNS Exp.	.066	.049	.080	.051	.019
SN	.175*	.180*	.071	.146#	.154*
NO		-.083	<b>.180*</b>		<b>-.151*</b>
NB				<b>.349***</b>	<b>.376***</b>
R <sup>2</sup>	.056	.063	.082	.172	.193

Notes: AC=Affective Commitment; NO=Online/offline Network Overlap; NB=Network Blurring; SNS Exp.=Social Networking Site Experiences; SN=Subjective Norm.  
# p < 0.1, \* p < 0.05, \*\*\* p < 0.001

Table 2: Bootstrapped CI Tests for Direct Effects on Affective Commitment.

IVs	Effects	2.5% lower bound	97.5% upper bound	Zero included?
Age	.031	-.206	.267	Yes
Gender	-.229	-.656	.147	Yes
SNS Exp.	.013	-.087	.113	Yes
SN	.156*	.006	.305	No
NO	-.153*	-.304	-.003	No
NB	.366***	.222	.510	No
R <sup>2</sup> =.193				

Notes: AC=Affective Commitment; NO=Online/offline Network Overlap; NB=Network Blurring; SNS Exp.= Social Networking Site Experiences; SN=Subjective Norm.  
# p < 0.1, \* p < 0.05, \*\*\* p < 0.001

Table 3: Bootstrapped CI tests for mediation effects on affective commitment.

Mediation Test (indirect effect)				Full/Partial Mediation Test (direct effect)				Type of mediation
Effect	2.5% lower bound	97.5% upper bound	Zero included?	Effect	2.5% lower bound	97.5% upper bound	Zero included?	
.069	.005	.160	No	-.153	-.304	-.003	No	Partial

Second, to further verify the partially mediated effect, we use PROCESS to conduct bootstrapping tests in SPSS with 10000 resamples. Table 2 and Table 3 report the 95% confidence intervals (CIs). Partially mediated effect is therefore verified.

## 6 CONCLUSIONS

Affective commitment formation is critical to online communities, which could enhance user engagement and produce continuous participations. Bring offline social connections online seems to be an intuitive remedy that enable the community to leverage on close ties for commitment development. Yet, our study suggests that this strategy, while broadly used, may not always bring positive results. It depends on whether the online interactions were able to create a sense of boundary blurring. Successful boundary

blurring triggers affective commitment spillover from offline connections to the online community. However, if the overlap fails to achieve boundary blurring, the next effect would be negative. Users would mostly treat online community as a supplementary channel to connect, while impede the development of affective commitment.

This study contributes to research on user behavior in SNSs. Our study suggests that the network boundary lens is pertinent to understand the development of users' psychological bond with the online community. We identify that network blurring mediates the effect from network overlap on commitment. Controlling for the mediated effect, the direct effect of network overlap is negative.

## REFERENCES

- Allen, N. J., and Meyer, J. P. 1996. Affective, continuance, and normative commitment to the organization: An examination of construct validity. *Journal of Vocational Behavior* (49:3), pp. 252-276.
- Altman, I. 1975. *The environment and social behavior: Privacy, personal space, territory, and crowding*. Cole Publishing, CA: Monterey.
- Bagozzi, R. P., and Yi, Y. 1988. On the evaluation of structural equation models. *Journal of the Academy of Marketing Science* (16:1), pp. 74-94.
- Bateman, P. J., Gray, P. H., and Butler, B. S. 2011. The impact of community commitment on participation in online communities. *Information Systems Research* (22:4), pp. 841-854.
- Becker, H. S. 1960. Notes on the concept of commitment. *American Journal of Sociology* (66:1), pp. 32-40.
- Brynjolfsson, E., and Smith, M. D. 2000. Frictionless commerce? A comparison of internet and conventional retailers. *Management Science* (46:4), pp. 563-585.
- Gu, B., Konana, P., Raghunathan, R., and Chen, H. M. 2014. The allure of homophily in social media: Evidence from investor responses on virtual communities. *Information Systems Research* (25:3), pp. 604-617.
- Hirschorn, M. 2007. Web 2.0 bubbles. from <http://www.theatlantic.com>, retrieved on January 12, 2016.
- Knowledge@Wharton. 2006. Myspace, Facebook and other Social Networking Sites: Hot today, gone tomorrow? from <http://knowledge.wharton.upenn.edu>, retrieved on January 12, 2016.
- Kumar, N., and Benbasat, I. 2006. The influence of recommendations and consumer reviews on evaluations of websites. *Information Systems Research* (17:4), pp. 425-439.
- Meyer, J. P., and Allen, N. J. 1991. A three-component conceptualization of organizational commitment. *Human Resource Management Review* (1:1), pp. 61-89.
- Meyer, J. P., Irving, G. P., and Allen, N. J. 1998. Examination of the combined effects of work values and early work experiences on organizational commitment. *Journal of Organizational Behavior* (19), pp. 29-52.
- Miller, J. G. 1978. *Living systems*. New York: McGraw-Hill.
- Morrison, T. L. 1985. Personal and professional boundary attitudes and effective group leadership in classrooms. *The Journal of Psychology: Interdisciplinary and Applied* (119:2), pp. 101-111.
- Pierce, J. L., Kostova, T., and Dirks, K. T., 2001. Toward a theory of psychological ownership in organizations. *Academy of Management Review* (26:4), pp. 298-310.
- Reagans, R., and McEvily, B. 2003. Network structure and knowledge transfer: the effects of cohesion and range. *Administrative Science Quarterly* (48:2), pp. 240-267.
- Tang, Q., Gu, B., and Whinston, A. B. 2012. Content contribution for revenue sharing and reputation in social media: A dynamic structural model. *Journal of Management Information Systems*, (29:2), pp. 41-76.
- Tech Times, 2015. Facebook losing teen audience. Now it's just old people socializing. from: <http://www.techtimes.com>, retrieved on January 12, 2016.
- Thompson, J. A. 2001. Commitment shift during organizational upheaval: Physicians' transitions from private practitioner to employee. In *Academy of Management Proceedings* (1), pp. C1-C6.
- Tsai, H. T., and Bagozzi, R. P. 2014. Contribution behavior in virtual communities: Cognitive, emotional, and social influences. *MIS Quarterly* (38:1), pp. 143-163.
- Wasko, M. M., and Faraj, S. 2005. Social capital and knowledge contribution. *MIS Quarterly* (29:1), pp. 35-57.
- Xu, B., Xu, Z., and Li, D. 2015. Internet aggression in online communities: A contemporary deterrence perspective. *Information Systems Journal*, forthcoming.
- Zhang, X., and Venkatesh, V. 2013. Explaining employee job performance: Role of online and offline workplace communication networks. *MIS Quarterly*, (37:3), pp. 695-722.