Interpersonal Relationship Needs of Virtual Behavior: From Virtual Communities to Virtual Worlds

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ABSTRACT
This paper aimed at exploring motivations for participation in virtual community and virtual world. An interpersonal relationship perspective was introduced as a framework to explore this participation behavior using an interpersonal relationship model—the Fundamental Interpersonal Relationship Orientation (FIRO) model (Will C. Schutz, 1958; William Carl Schutz, 1966). Specifically, the paper attempted to demonstrate that members’ virtual behavior was a response of them to fulfill their interpersonal relationship needs. Two types of their virtual involvement behavior -- Behavior to Obtain Information (BOI) and Behavior to Give Information (BGI) -- were investigated in our research. Data used in our analysis was collected from a virtual community—Microsoft Chinese Community and a virtual world—Cyworld. Our ANOVA results suggested that interpersonal relationship model was an applicable construct to explain virtual behavior.

Keywords
Virtual worlds, virtual communities, interpersonal relationship, virtual participation

INTRODUCTION
The last two decades has witnessed a burgeoning of Internet applications and their diffusion to societal level. People are now connected with the use of computers, forming social networks can bring huge influence on their life and society (Igbaria, 1999). So far we have experienced three waves of Internet application -- web 1.0 to 3.0. In the era of web 1.0, Internet applications were focused on the static contents of the website, where people could only read the contents on the web pages. In web 2.0 applications, people did not only read, but also allowed to write in the Internet space. Virtual communities are one of those web 2.0 age applications where a group of people with similar interests communicated online regularly for some duration in an organized way (C. M. Ridings, D. Gefen, and B. Arinze, 2002). Recently the concept of Web 3.0 was initiated to allow people not only to read and write, but also to have very natural interaction with each other. The emergence of social networking software (such as Cyworld, LinkedIn, and Facebook), the virtual world (such as Habbo Hotel and Second life), and Massively Multiplayer Online Game (MMOGs) (such as the World of Warcraft) suggested to us that virtual world activities are getting more dominant in our future lives. A virtual world is an online space where residents are avatars representing the player in that world (Reina Yahya and Karl Reiner, 2008).

The technologies of virtual communities and virtual worlds have been evolved into numerous promising business applications. Virtual communities, for example, have been used to support activities such as market expansion (Kozinets, 1999), customer services provision (E. Y. Kim and Kim, 2004), customer loyalty retention (E. Y. Kim and Kim, 2004), brand building (McWilliam, 2000), and business transaction support (Hagel and Armstrong, 1997; Rothaermel and Sugiyama, 2001). Virtual worlds, on the other hand, have been operated to promote branding and marketing (Hemp, 2006; Papagiannidis, Bourlakis, and Li, 2008; Stuart and Jan, 2008), business training and education (Brenda, Fiona Fui-Hoon, and Keng, 2008), game industry (Jin and Chee, 2008), and the potential business model called virtual commerce (Papagiannidis et al., 2008; Reina Yahya and Karl Reiner, 2008) in virtual worlds.

The success of both virtual community and virtual world requires a critical mass of members and a degree of their participations to keep their websites from being operational and profit generating. (Hagel and Armstrong, 1997;
Papagiannidis et al. (2008). Thus, the virtual behaviors of members in their virtual communities or virtual worlds, which could be a series of involvement into various virtual activities such as browsing, writing blogs, sharing information, and networking, are critical to the survival of these communities. Thus, this paper aims at exploring motivations driving members’ virtual behavior in either virtual communities or virtual communities. An interpersonal relationship perspective is introduced as a framework to explore the participation of virtual behavior, using the Fundamental Interpersonal Relationship Orientation (FIRO) model (Will C. Schutz, 1958; William Carl Schutz, 1966). Specifically, the paper attempted to demonstrate that members’ virtual behavior was a response of them to fulfill their interpersonal relationship needs. Two types of their virtual involvement behavior -- Behavior to Obtain Information (BOI) and Behavior to Give Information (BGI) – were investigated in our research.

LITERATURE REVIEW

Virtual community behavior

Virtual community members’ participation has been explored by many researchers (Wang and Fesenmaier, 2003, 2004a). Generally, virtual community participation behavior has been studied in three perspectives, general participation, lurking, and active participation. The general participation behavior, defined either as the time and frequency spent in VCs (Wang and Fesenmaier, 2003, 2004a, 2004b) or the intention to participate in VCs (Bagozzi and Dholakia, 2002; Teo, Chan, Wei, and Zhang, 2003), has been investigated in several studies and the result showed that social psychological reasons are major causes to virtual community participation.

Lurking is the behavior of viewing messages in a virtual community but not posting any. People who lurk are called lurkers. Lurking behavior has been reported in a series of studies (Brazelton and Gorry, 2003; Christie and Azzam, 2004; McKee, 2002; Preece, Nonnecke, and Andrews, 2004) but has not been extensively investigated.

In fact, the behavior of posting messages in VCs generates more interest from virtual community researchers than lurking and general participation behavior. The reason is that active virtual community participations are contributive to the virtual community’s continued success, despite the fact that this behavior is spontaneous, unrewarding and time-consuming. In general, three perspectives have been proposed to explore and explain this behavior. The first perspective is from the gift economy viewpoint, and has been studied by several researchers (Kollock, 1999; Rheingold, 2000; Wang and Fesenmaier, 2003; Wasko and Faraj, 2000). The second perspective on active virtual community contribution can be attributed to and explained by social identity theory (Dholakia, Bagozzi, and Pears, 2004), self-efficacy theory (Wang and Fesenmaier, 2004b), and Self-presentation theory (Papacharissi, 2002; Schlenker, 1985), which are all sub-theories of self-concept theory. Based on the self-concept theory, an individual can gain satisfaction and build their ideal self through managing his or her social identity (Tajfel and Turner, 1986), self impressions (Schlenker, 1985), and self-efficacy (Bandura, 1982, 1986) in social groups. VCs, as examples of social groups, can enable members to build their social identity, manage their self-impression, and increase their self-efficacy. Such activities in VCs as answering messages, tackling difficult questions, and sharing experiences, may facilitate members in achieving their ideal selves. The third perspective of active virtual community participation arises from social-related constructs such as culture (McKe, 2002), trust (Catherine M. Ridings, David Gefen, and Bay Arinze, 2002), and centrality in the network and self-related expertise (Wasko and Faraj, 2005), friendship (Carter, 2005). These constructs are based on social capital theories, which state that trust, social networks and other social factors people acquire in VCs are valuable resources and are beneficial for their social recognition.

Virtual world behavior

Although the notion of virtual world has been proposed since 1980, the academic literature on it only emerges in the last decades especially recent several years. The study on virtual world, as well as the virtual world technology, is still in its infancy. According to Fetscherin (2008), the virtual world research can be classified into four categories based on two lines -- the individual/company level and the game/social-interaction orientation. The game and social-interaction oriented virtual worlds differ in many ways. For example, “levels”, “scores”, “end” and “game over” exist in game oriented virtual worlds, but not in social interaction oriented worlds. In this study, our focus is on the social-interaction oriented virtual worlds at the individual level.

Broadly speaking, behavior in social-interaction oriented virtual world can be classified into two types—behavior to get information and behavior to post information (Jung, Youn, and McClung, 2007), although there are several other peripheral types of behavior such as playing games and searching friends. Of the limited research investigating virtual world members’ participation motivation, the community factors, relationship factors, and social psychological factors were all found to be critical. Fetscherin et al. (2008) conducted an empirical study in Second Life to investigate members’ intention to participate.
in virtual world and found that community factors such as communication, collaboration, and cooperation played a pivotal role in influencing user intention and their subsequent acceptance of Virtual Worlds. In another paper, Jung et al. (2007) investigated members in Korean-based Cyworld and found that entertainment and personal income factors are main motives people maintain their homepage in Cyworld. In another paper discussing members’ participation behavior in Cyworld, Kim and Yun found that the emotional and relationship side of virtual world members are the main reason for them to participate.

Research studies in virtual worlds, as well as virtual communities, are both in their early stage and exploratory in nature. Findings from these limited investigations suggests that the relational, social psychological and emotional factors are the main reasons for members to participate. The current needs for virtual world research thus are 1) to set up a theoretical framework to investigate motivations of virtual world members’ involvement; 2) to empirically test the proposed framework; and 3) to differentiate the two main types of virtual world behavior and identify the factors influencing these two behaviors.

**The Interpersonal Relationship Perspective and the FIRO Model**

The interpersonal relationship perspective offered in this study aims to provide a framework for members’ virtual behavior. Before virtual environments existed, relationship building could only be fulfilled in offline environments. However, research has found that virtual environments can also satisfy people’s needs for relationships (Carter, 2005; Nip, 2004). Nevertheless, the interpersonal relationship perspective on virtual behavior has never been examined in previous virtual world studies.

Fundamental Interpersonal Relationship Orientation (FIRO) is a theory proposed by Schutz in 1958 to describe and explain individual behavior and the interactions of people, that is, interpersonal relationships, with simple but comprehensive characteristic orientations. To be applied empirically, FIRO was operationalized as FIRO-B (FIRO behavior). Since the introduction of FIRO, its measures have been widely adopted in social psychology research. On average, FIRO has an average of twenty-five citations annually in the Social Science Citation Index (Hurley, 1990). Furnham (1990; , 1996) indicated that the FIRO-B was one of the three most widely used questionnaires in occupational psychology.

Schutz (1958; , 1966) proposed that interpersonal relationships could be measured by a person’s intention to interact with others. He argued that people’s intention to interact with others can be measured by three dimensions—inclusion, control, and affection. Each of these three dimensions has two behavior directions—expressed and wanted behavior. In total, there are six dimensions in FIRO—expressed inclusion, wanted inclusion, expressed control, wanted control, expressed affection, and wanted affection. Based on this framework, the expressed behavior describes the extent of people’s willingness to include, control, and loves others, whereas wanted behavior describes the extent of people’s willingness to be included, controlled, and loved by others.

The FIRO model can be applied to all situations in which interpersonal relationships are investigated (William Carl Schutz, 1966). There are three levels of the theoretical application of the model, based on the number of persons involved in the interpersonal relationship—the individual level (one person), family level (more than two persons), and group level (more than two people). While individual-level applications described mainly an individual’s orientation in the three dimensions, which provide the foundation to analyze the individual’s social behaviors, family-level applications mainly deal with how the orientations of family members in the three areas influences their relationships inside and outside the family, and group level applications deal mainly with how the match of the orientations of group members in the three dimensions, namely, the group’s compatibility, affect the group’s performance (Di Marco, 1974; Hill, 1977; Ilen and O’Brien, 1974), effectiveness (Fisher, Macrosson, and Walker, 1995; Smith and Linton, 1975), and efficiency (Hewett and O’Brien, 1974).

**CONCEPTUAL MODEL**

Although interpersonal relationship theories were developed before virtual communities and virtual worlds existed, we believe that they are appropriate for application in the investigation of virtual worlds because relationships are not bounded by the physical body, and people’s online identity is strongly associated with their offline identity (Powers, 2003). The FIRO model, illustrated in Figure 1 postulates that virtual behavior is due to the fulfillment of the three levels of interpersonal relationship needs—the need for inclusion, the need for control, and the need for affection—suggested by Schutz (1966). Virtual behavior is classified into BGI and BOI, to understand the involvement behaviors in greater depth.

In interpersonal relationships, each person has both expressed and wanted orientation in these three dimensions. The wanted behavior represents an individual’s tendency to receive attention or affection from others or to be controlled by others, whereas the expressed represents the individual’s tendency to include others in his or her life, express affection, or exert control over others. Hence, the FIRO model proposed in this paper has six antecedents, developed along the three interpersonal relationship need dimensions through the wanted and expressed aspects.
From the communicational perspective, the FIRO model is appropriate for the virtual world environment. Developed by Schutz in 1958, the purpose of the FIRO model is to provide a simple explanation of why people interact with others, that is, why people develop interpersonal relationships. Schutz (1966) stated that the maxim “people need people” was the initial motivation for him to develop the FIRO theory. The entire purpose of his theory is to state, explicate, elaborate, and test the maxim that “people need people” mainly in three dimensions— inclusion, control, and affection. This theory is applicable to any context that involves interpersonal behavior, which suggests that it can be extended to the virtual world environment. Thus, the following hypotheses are developed.

**H1** Members who score higher on wanted inclusion will obtain information more frequently than those who score lower.

**H2** People who score higher on wanted inclusion will give information more frequently than those who score lower.

**H3** People who score higher on expressed inclusion will obtain information more frequently than those who score lower.

**H4** People who score higher on expressed inclusion will give information more frequently than those who score lower.

**H5** People who score higher on wanted control will obtain information more frequently than those who score lower.

**H6** People who score higher on wanted control will give information more frequently than those who score lower.

**H7** People who score higher on expressed control will obtain information more frequently than those who score lower.

**H8** People who score higher on expressed control will give information more frequently than those who score lower.

**H9** People who score higher on wanted affection will obtain information more frequently than those who score lower.

**H10** People who score higher on wanted affection will give information more frequently than those who score lower.

**H11** People who score higher on expressed affection will obtain information more frequently than those who score lower.

**H12** People who score higher on expressed affection will give information more frequently than those who score lower.

**RESEARCH METHODOLOGY**

In this study, two surveys from a virtual community and a virtual world were performed to investigate the virtual behavior. Data was collected from Microsoft Chinese Community—a value-added professional community of a large software company and Cyworld—a combination of Second Life and MySpace. Microsoft Chinese Community was chosen because it represents a very technical and professional community. Cyworld was chosen not only because it is a typical virtual world website aiming at networking, but also because it is a Korean e-community having 18 million members—90 percent of all Koreans in their 20s are signed up. The business model earns its owners $7.78 per member per year.
Data Collection
An online questionnaire was developed to collect data from Microsoft Chinese Community and Cyworld. For ease of management, the online questionnaire was hosted on a service provider’s site (http://www.my3q.com) that provided free questionnaire creation services. The use of a service provider also allowed us to deal with the problems of access control, authentication, and multiple responses associated with the Web-based data collection approach (Stanton and Rogelberg, 2001).

Operationalization
The dependent variables of this study were BOI and BGI. BGI measured how eagerly one “talks,” namely, posts messages in a virtual environment; BOI measured the extent to which one retrieves information from a virtual environment. BOI and BGI were operationalized using a Likert scale (1 to 7) with measures developed from the actual usage behavior in information systems (Davis, 1989; Limayem and Hirt, 2003; Catherine M. Ridings et al., 2002; Straub, Limayem, and Karahanna-Evaristo, 1995; Wang and Fesenmaier, 2004b). Most of these measures, which were derived from information technology adoption studies, were based on the time spent, and the frequency of participation, in the virtual world.

In this study, we adopted Schutz’s (1966) instrument—FIRO-B (Behavior) scale to measure the three dimensions of FIRO—the need for inclusion, the need for control, and the need for affection. According to Schutz (1966), each of the three dimensions has two aspects: expressed behavior and wanted behavior. Thus, the model has six constructs—expressed inclusion, wanted inclusion, expressed control, wanted control, expressed affection, and wanted affection. There were nine items for each construct measured in Guttman Scale.

Instrument Validation
Four-stage survey validation was conducted to ensure the validity and reliability of the questionnaire. First, whenever possible, previously validated questions were used, and generally accepted online instrument construction guidelines (Catherine M. Ridings et al., 2002; Stanton and Rogelberg, 2001; Wang and Fesenmaier, 2003) were observed as much as possible. Second, the questionnaire was pretested by one MIS professor, seven business doctoral students, and two experienced virtual world webmasters. Third, the pilot test for the questionnaire was conducted for the questionnaire in both Microsoft Chinese Community and Cyworld before real data collection. The reliability of all the constructs exceeds 0.70 except Expressed Inclusion (0.67) slightly below 0.70, which is still acceptable for exploratory study (Nunnally and Bernstein, 1994)

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach’s Alpha (Pilot)</th>
<th>Cronbach’s Alpha (Microsoft)</th>
<th>Cronbach’s Alpha (Cyworld)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI (Expressed Inclusion)</td>
<td>0.75</td>
<td>0.70</td>
<td>0.67</td>
</tr>
<tr>
<td>WI (Wanted Inclusion)</td>
<td>0.95</td>
<td>0.87</td>
<td>0.88</td>
</tr>
<tr>
<td>EC (Expressed Control)</td>
<td>0.85</td>
<td>0.82</td>
<td>0.79</td>
</tr>
<tr>
<td>WC (Wanted Control)</td>
<td>0.77</td>
<td>0.81</td>
<td>0.76</td>
</tr>
<tr>
<td>EA (Expressed Affection)</td>
<td>0.81</td>
<td>0.85</td>
<td>0.78</td>
</tr>
<tr>
<td>WA (Wanted Affection)</td>
<td>0.92</td>
<td>0.83</td>
<td>0.73</td>
</tr>
</tbody>
</table>

Table 1. the Reliability

DATA ANALYSIS RESULTS
A total of 1125 responses were collected from Microsoft Chinese community and Cyworld. Of these 1125 responses, 562 responses were from Microsoft and 563 from Cyworld. After checking for data integrity, 27 responses from Microsoft and 4 from Cyworld were removed due to multiple responding problems, thus resulting in a total of 535 effective responses from Microsoft and 559 from Cyworld.

Profile of Respondents
The 559 respondents from Cyworld were from South Korean. According to the respondent profile, most respondents were male (63%), and single (97%). Their occupations varied from unemployed to professionals, with most of them being graduate/college students. Regarding their ages, the respondents were predominately (94%) in the range of 19-28. As for their
education level, most of them (96%) were college graduates. Probably because most of them are students, their income are relatively low with 74% of them having an income below 500$ per month.

Respondents from the Microsoft Chinese community are typically male (95%), predominantly below 28 years old (82.05%), college or above college educated (85.05%), single, with high income, and work in computer-related fields (47.85%) or are students.

Reliability of FIRO

Prior to testing our FIRO model for hypotheses validation, the research model was tested for its reliability by calculating all items’ Cronbach’s Alpha. Table 1 gives the Cronbach’s Alpha value for each of the six dimensions of FIRO-B. The result showed that all the values are above the accepted 0.70 except EI from the Cyworld slightly lower than 0.70, which is acceptable for the exploratory study (Nunnally and Bernstein, 1994).

Validity of FIRO

The validity of FIRO was assessed with reproducibility and scalability, which was based on Guttman scale (1950). Guttman (1950) and Menzel (1953) have developed two coefficients respectively. The accepted level for coefficient of reproducibility and coefficient of scalability were suggested by Guttman (1950) as above 0.90 and Menzel (1953) as somewhere between 0.60 and 0.65 respectively. The calculation method for coefficient of reproducibility and coefficient of scalability was showed in the following equations.

\[
C.R. = 1 - \frac{\text{Errors}}{\text{Total Responses}}
\]

\[
C.S. = 1 - \frac{\text{Errors}}{\text{Maximum Errors}}
\]

The coefficients of reproducibility and coefficients of scalability are depicted in Tables 2 and 3. The results showed that all of the reproducibility coefficients, are above the recommended 0.85 (Guttman, 1944). As for scalability test, all of our coefficients were above the suggested 0.60 level except WA slightly lower than 0.60 thus signifying acceptable scalability for our instrument.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Coefficient of Reproducibility (Microsoft)</th>
<th>Coefficient of Reproducibility (Cyworld)</th>
<th>Recommended value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI</td>
<td>0.92</td>
<td>0.98</td>
<td>&gt;=0.85</td>
</tr>
<tr>
<td>WI</td>
<td>0.93</td>
<td>0.95</td>
<td>&gt;=0.85</td>
</tr>
<tr>
<td>EC</td>
<td>0.93</td>
<td>0.97</td>
<td>&gt;=0.85</td>
</tr>
<tr>
<td>WC</td>
<td>0.94</td>
<td>0.97</td>
<td>&gt;=0.85</td>
</tr>
<tr>
<td>EA</td>
<td>0.91</td>
<td>0.91</td>
<td>&gt;=0.85</td>
</tr>
<tr>
<td>WA</td>
<td>0.87</td>
<td>0.89</td>
<td>&gt;=0.85</td>
</tr>
<tr>
<td>Average</td>
<td>0.92</td>
<td>0.95</td>
<td>&gt;=0.85</td>
</tr>
</tbody>
</table>

Table 2. Coefficient of Reproducibility for FIRO
Construct | Coefficient of Scalability (Microsoft) | Coefficient of Scalability (Cyworld) | Recommended value
--- | --- | --- | ---
EI | 0.68 | 0.92 | >=0.60
WI | 0.66 | 0.87 | >=0.60
EC | 0.74 | 0.88 | >=0.60
WC | 0.78 | 0.88 | >=0.60
EA | 0.60 | 0.75 | >=0.60
WA | 0.46 | 0.59 | >=0.60
Average | 0.65 | 0.82 | >=0.60

Table 3. Coefficient of Scalability for FIRO

Test of FIRO on Virtual Behavior

The six dimensions of FIRO’s effect on VC behavior were tested by ANOVA. The score of each dimension was categorized into nine groups according to the original FIRO-B scale, which were then assessed using ANOVA tests. Prior to the conduction of ANOVA tests, the assumptions of ANOVA test were assessed in terms of the normality and homogeneity. The test results suggest satisfactory normality and equal variance, except that some variables violated the homogeneity assumption. However, these deviations are minor and would not influence the robustness of our model test (Kerlinger and Lee, 2000). Table 4 reports the ANOVA results of VC behavior.

<table>
<thead>
<tr>
<th>Construct</th>
<th>DV</th>
<th>F</th>
<th>Sig.</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI</td>
<td>BOI</td>
<td>1.089</td>
<td>.369</td>
<td>1.653</td>
<td>0.097</td>
</tr>
<tr>
<td></td>
<td>BGI</td>
<td>2.342</td>
<td>.014*</td>
<td>2.139</td>
<td>0.025*</td>
</tr>
<tr>
<td>WI</td>
<td>BOI</td>
<td>.846</td>
<td>.574</td>
<td>1.461</td>
<td>0.159</td>
</tr>
<tr>
<td></td>
<td>BGI</td>
<td>1.655</td>
<td>.097</td>
<td>1.335</td>
<td>0.216</td>
</tr>
<tr>
<td>EC</td>
<td>BOI</td>
<td>.669</td>
<td>.737</td>
<td>2.678</td>
<td>0.005**</td>
</tr>
<tr>
<td></td>
<td>BGI</td>
<td>1.380</td>
<td>.194</td>
<td>4.140</td>
<td>0.000***</td>
</tr>
<tr>
<td>WC</td>
<td>BOI</td>
<td>1.136</td>
<td>.335</td>
<td>3.674</td>
<td>0.000***</td>
</tr>
<tr>
<td></td>
<td>BGI</td>
<td>1.634</td>
<td>.102</td>
<td>5.184</td>
<td>0.000***</td>
</tr>
<tr>
<td>EA</td>
<td>BOI</td>
<td>.983</td>
<td>.453</td>
<td>2.839</td>
<td>0.003**</td>
</tr>
<tr>
<td></td>
<td>BGI</td>
<td>2.535</td>
<td>.007**</td>
<td>3.518</td>
<td>0.000***</td>
</tr>
<tr>
<td>WA</td>
<td>BOI</td>
<td>1.561</td>
<td>.124</td>
<td>2.271</td>
<td>0.017*</td>
</tr>
<tr>
<td></td>
<td>BGI</td>
<td>2.192</td>
<td>.021*</td>
<td>1.672</td>
<td>0.093</td>
</tr>
</tbody>
</table>

Table 4. One-way ANOVA of FIRO on Virtual Participation

*significant at .05 level **significant at 0.01 level *** significant at 0.001 level

Based on the findings depicted in Table 4, 3 out of 12 hypotheses in virtual community and 8 out of 12 hypotheses in virtual world were found to be significant. The means plot provided by the SPSS showed that all the supported hypotheses follow the hypothesized directions. Table 4 summarized the supported hypotheses in our FIRO model.
### Table 5. Supported Relationships

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Relationships</th>
<th>Supported or Not Microsoft</th>
<th>Supported or Not Cyworld</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EI→BOI</td>
<td>Not supported</td>
<td>Not supported</td>
</tr>
<tr>
<td>2</td>
<td>EI→BGI</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>WI→BOI</td>
<td>Not supported</td>
<td>Not supported</td>
</tr>
<tr>
<td>4</td>
<td>WI→BGI</td>
<td>Not supported</td>
<td>Not supported</td>
</tr>
<tr>
<td>5</td>
<td>EC→BOI</td>
<td>Not supported</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>EC→BGI</td>
<td>Not supported</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>WC→BOI</td>
<td>Not supported</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>WC→BGI</td>
<td>Not supported</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>EA→BOI</td>
<td>Not supported</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>EA→BGI</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>11</td>
<td>WA→BOI</td>
<td>Not supported</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td>WA→BGI</td>
<td>Yes</td>
<td>Not supported</td>
</tr>
</tbody>
</table>

### DISCUSSION, IMPLICATIONS, AND LIMITATIONS

**Discussion**

This paper attempted to empirically explore virtual behavior in virtual communities and virtual worlds from an interpersonal relationship perspective using the FIRO theory. The findings suggest that FIRO is an applicable theoretical foundation to evaluate virtual behavior in virtual world (with eight out of twelve hypotheses supported) and virtual community (three out of twelve hypotheses supported). It’s interesting to note a difference in their model significance as virtual worlds and virtual community are quite similar in nature, though their social orientation is different. It’s thus worth a further exploration of this difference in future investigations.

The three dimensions of the FIRO model are found to have significant influence on people’s participation in both virtual communities and virtual worlds. Previous studies have pointed out that factors such as relational factors (K.-H. Kim and Yun, 2007), community factors (Fetscherin and Lattemann, 2008), and emotional factors (Jung et al., 2007) are reasons for participation in virtual worlds. The results of the FIRO model in this paper not only confirm the factors identified in previous studies, but also link these factors together to provide a better conceptual framework for future research.

The interpersonal relationship perspective adopted in this paper supports the notion that virtual behavior is due to people’s needs to interact with others. It’s very interesting that in virtual community such as Microsoft Chinese Community these needs were less fulfilled than in Cyworld.

It is interesting to find that FIRO, which was developed for explaining offline behavior, was also effective in explaining online behavior. Initially, FIRO was developed to explain people’s interpersonal behavior but this theory has seldom been applied to investigate virtual environment. Our study might be the first time the FIRO model was applied to study online behavior in the context of a virtual environment. Its effectiveness in this context confirms our belief that people behaved similarly in both offline and online environment – our needs for interpersonal relationships are the same, whether the relationship is offline or online. In the web 3.0 era, we could have an addition choice of online needs fulfillment, if they could not be fulfilled offline.

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