

Does Trust Promote More Teamwork? Modeling Online Game Players' Teamwork Using Team Experience as a Moderator

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Abstract

The need for teamwork has grown significantly in today's organizations. Especially for online game communities, teamwork is an important means of online game players' engagement. This study aims to investigate the impacts of trust on players' teamwork with affective commitment and normative commitment as mediators. Furthermore, this research includes team experience as a moderator to compare the difference between different player groups. A model was proposed and tested on 296 online game players' data using structural equation modeling. Findings revealed that team experience moderated the relationship between trust and teamwork. The results indicated that trust promotes more teamwork only for players with high experience through affective commitment than those who with low experience. Implications of the findings are discussed.

Introduction

TEAMWORK, WORKING COLLABORATIVELY with a group of people to achieve a goal, is identified as an effective, system-based intervention that has broad implications for all organizations.¹ Teamwork is the basis for organizational development today, since the increasing complexity of projects has made it unachievable for individuals. Especially for online gaming communities, teamwork plays a critical role because prior studies have proposed that teamwork is highly correlated to players' motivation to engage in game playing.² Teamwork also brings numerous benefits to online game players, such as giving players more control and decision-making power in a group, resolving members' conflicts, and providing greater opportunities to engage in interactive learning activities and peer tutoring, which allow players to practice and clarify game skills through others' assistance.^{3,4} Consequently, these benefits attract more online game players to pay more time and contribute to the success of games.^{4,5} Thus, to understand and cultivate teamwork is getting more and more important for both game practitioners and scholars.

Manser⁶ proposed that trust, shared mental models, coordination, communication, and leadership are factors affecting teamwork. Among these factors, prior studies highlighted trust as the most important factor contributing to successful teamwork, because trust leads to a set of behavioral expectations among players.⁶⁻⁸ Trust refers to the confidence of the players that they will not be harmed or put at risk by the actions of the other party.⁹ Trust allows players to manage the

uncertainty or risk associated with the interaction, and this enables the players to jointly optimize the gains, which will foster more teamwork behavior.¹⁰

Despite the importance of trust in teamwork, previous research also reported that organizational teamwork is fragile for most online teams because of team dynamics.¹¹ The purpose of this work is to establish a clear understanding as to the formation and mediators to eventually help understand the formation of teamwork in online game settings. Some of the emerging ideas in the literature suggest that introducing online games actively in the workplace might in fact improve employees' teamwork.¹² For instance, a recent survey reported that IBM managers used lessons learned from online games to promote teamwork in their real jobs.¹² Compared with other types of online communities, learning teamwork from online games is different and more essential. Online games have the guild system to teach users about interpersonal and intercultural communication skills.^{12,13} Online games also provide an in-game shared space to alleviate the social isolation caused by lack of face-to-face interaction.^{12,14} Foremost, online games motivate users to engage in teamwork situations through an engagement cycle comprising motivating emotion, player re-engagement, social call to action, and visible progress/reward.¹³ Therefore, along with the trend of gamification, studying teamwork in online game settings can bring some helpful ideas for both the researchers and the practitioners.

This work differs from previous research in three important ways. First, this study aims to examine the effect of trust

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on teamwork in the gaming context. The issues related to the influence of trust on teamwork have been examined for real-world teams in some previous research,¹²⁻¹⁴ but in contrast, it is still uncertain whether the findings of previous research can be applied in various online teamwork environments.

Second, prior studies considered that the influence of trust on teamwork is mediated by several factors comprising cognitive ability, emotional intelligence, mental model, and organizational commitment.¹⁵⁻¹⁸ Among these factors, organizational commitment comprising affective commitment and normative commitment is applied herein, because it helps explain various social relationships that are critical for collaboration and interactions among players.^{15,19} Affective commitment refers to team members' emotional attachment to, identification with, and involvement with a team, while normative commitment reflects members' sense of obligation to remain on a team.¹⁵

Eventually, team experience is assessed as a critical moderator during the formation of teamwork. Even though experience is an important variable in the context of consumer behavior (e.g., Yoon²⁰), it has been rarely studied under the issue of teamwork. Therefore, this research includes team experience as a moderator to compare the differences between different player groups.

Research framework and hypothesis development

The research model, as displayed in Figure 1, illustrates that trust affects teamwork through affective commitment and normative commitment. This study extends the commitment theory model proposed by Meyer and Allen,¹⁵ and we believe that it can be utilized to explain the relationship between trust and teamwork. More specifically, in the proposed model, team experience operates as a moderator to compare the differences among groups.

We consider the level of team experience as a potential moderating variable because a review of the literature reveals that players with a high level of experience are different from those with a low level of experience in terms of the knowledge structure.^{21,22} Hernandez Maestro and colleagues²³ indicated that differences in the knowledge structure are reflected in varying cognitive behaviors related to information processing, such as problem solving, reasoning and induction, forming opinions, and recalling and recognizing information. Specifically, many studies have highlighted the importance of experience on players' behavior and intention. For instance, Bennett et al.²⁴ conducted a study on business-to-business brand commitment and found that use experience

is the critical moderator for managers' decision making. Yoon²⁰ also investigated the antecedents of customer satisfaction with Internet service in China and explored how the experience operates as the moderator on users' satisfaction and commitment. He found that users with a high level of use experience perceive a different level of commitment compared with those with a low level of use experience. Many game studies also suggested that use experience is very critical to players' social interaction behavior and intention.²⁵⁻²⁷ These observations imply that players may perceive teamwork differently depending on their team experience.

To optimize gaming achievement, online game players utilize the reciprocal relation with other team members if they need items, weapons, and equipment. This reciprocal relationship operates between players based on the foundation of mutual trust.²⁸ Mutual trust provides a sense of belonging and comfort to support team members, which facilitates team members' affective attachment to organizations. Moreover, mutual trust is considered an important ingredient in the long-term stability of the organization and the well-being of its members.²⁹ Fukuyama³⁰ also found that higher levels of trust fulfill members' social needs and sense of belonging, which drive experienced team members to implement organizational tasks and missions spontaneously. Steinauer et al.³¹ surveyed organizational trust issues in an e-commerce environment and found high level trust not only motivates member's organizational citizen behavior but also facilitates member's sense of obligation. Thus, this study hypothesizes that trust will increase experienced members' affective commitment and normative commitment to teams. Two hypotheses of this study are as follows:

H1a: The relationship between trust and affective commitment is moderated by experience, and the relationship is stronger among college players with high levels of experience than among those with low levels of experience.

H1b: The relationship between trust and normative commitment is moderated by experience, and the relationship is stronger among college players with high levels of experience than among those with low levels of experience.

Adebanjo and Kehoe¹⁷ conducted a study on employees' teamwork in organizations and found that experienced employees' affective commitment is highly correlated with members' teamwork. He found that affiliating needs within the workplace will increase members' attitude to work with others. Silos³² identified that the key to Japanese efficiency was teamwork and concluded that affective commitment is the predictor of experienced members' teamwork. Moreover,

FIG. 1. Proposed conceptual model.

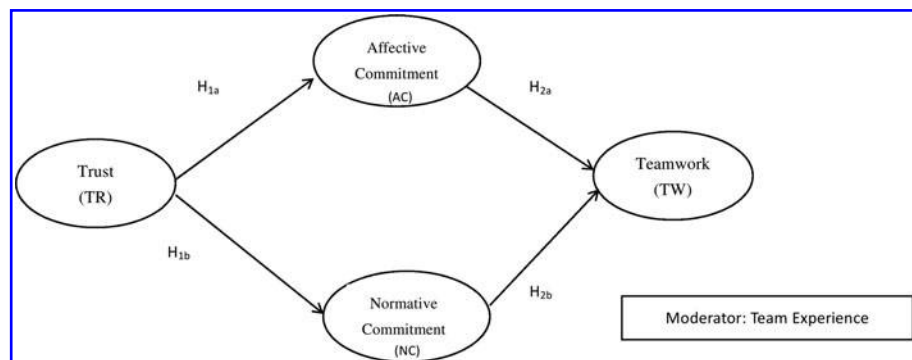


TABLE 1. STUDY PARTICIPANTS: HIGH-EXPERIENCED PLAYERS (N=155) AND LOW-EXPERIENCED PLAYERS (N=141) OF THIS STUDY

Participants (N=296)	n	Percent	High (percent)	Low (percent)
College level				
First year	77	26.01	51.95	48.05
Second year	62	20.95	51.61	48.39
Third year	37	12.50	54.05	45.95
Fourth year	28	9.46	42.86	57.14
Graduates	92	31.08	55.43	44.57
Sex				
Male	231	78.04	54.98	45.02
Female	65	21.96	43.08	56.92
Guild participation experience				
None	0	—	—	—
1–12 months	87	29.39	49.43	50.57
12–36 months	105	35.47	56.19	43.81
> 36 months	104	35.14	50.96	49.04
No. of friend list				
< 10	54	18.24	55.56	44.44
10–25	116	39.19	50.86	49.14
25–40	91	30.74	51.65	48.35
> 40	35	11.82	54.29	45.71
Team experience				
≥20 times team play per week	155	52.36		
<20 times team play per week	141	47.64		

Mean age 20.02 years (SD=3.11).

teamwork increases overall organizational performance by enhancing synergy and coordinated efforts, which increases members' sense of obligation within an organization.^{33,34} Therefore, on the basis of the above literature, we propose the following hypotheses:

H2a: The relationship between affective commitment and teamwork is moderated by experience, and the relationship is stronger among college players with high levels of experience than among those with low levels of experience.

H2b: The relationship between normative commitment and teamwork is moderated by experience, and the relationship is stronger among college players with high levels of experience than among those with low levels of experience.

Methods

Subjects

To gain a clear understanding of players' team experience in games, a participative observation was first conducted

with 10 World of Warcraft (WOW) players (five male and five female). We observed and collected data from their team-play behaviors and player-to-player interaction. On the basis of the collected information, we found that 20 team plays per week is the median of team-play frequency among all participants. The result was also supported by extensive reviews of reference artifacts such as documents, communication logs, news and development updates, and posts in WOW main forums. Therefore, we adopted 20 team-plays per week as the cutoff point for high- and low-experience groups.

An online survey was then advertised on course Web sites and bulletin board systems to recruit WOW players to participate in this study. After excluding volunteers with incomplete data, the data of 296 college students were collected in this study. Table 1 summarizes the demographic data of all subjects. At this stage, we divided the subjects into two groups: 155 players with more than 20 team plays per week as the high-experience group and all others as the low-experience group.

Measures

The questionnaire used for data collection contained scales to measure the various constructs of the research model. The measurements were adapted from the studies by DeRosa et al.,⁸ Hsu et al.,²⁷ Bateman et al.,³⁵ Meyer and Allen,¹⁵ and McCallum.³⁶ A pilot test was, therefore, conducted with university players to validate the measurement items. The wording of the survey items was modified based on the results of the pilot test and the advice of game study experts. Individuals indicated their agreement or disagreement with the survey items using a seven-point scale. Data were analyzed in two stages. First, a validity test on the research measurements was conducted by a confirmatory factor analysis. Second, an analysis of the structural multigroup model was used to test the associations in the research model.

Reliability and validity of measurement items

As shown in Table 2, Cronbach's alpha for all constructs was above 0.7. Accordingly, the questionnaire meets the requirement of inner reliability.³⁷ The factor-loading value of all items was greater than 0.5, and the composite reliability of all constructs was greater than 0.7, which met the requirement of convergent validity^{38,39} (Table 2). Discriminant validity was also very high because each construct's square root value of the average variance extracted was higher than the others in corresponding rows³⁸ (Table 2).

Structural model testing

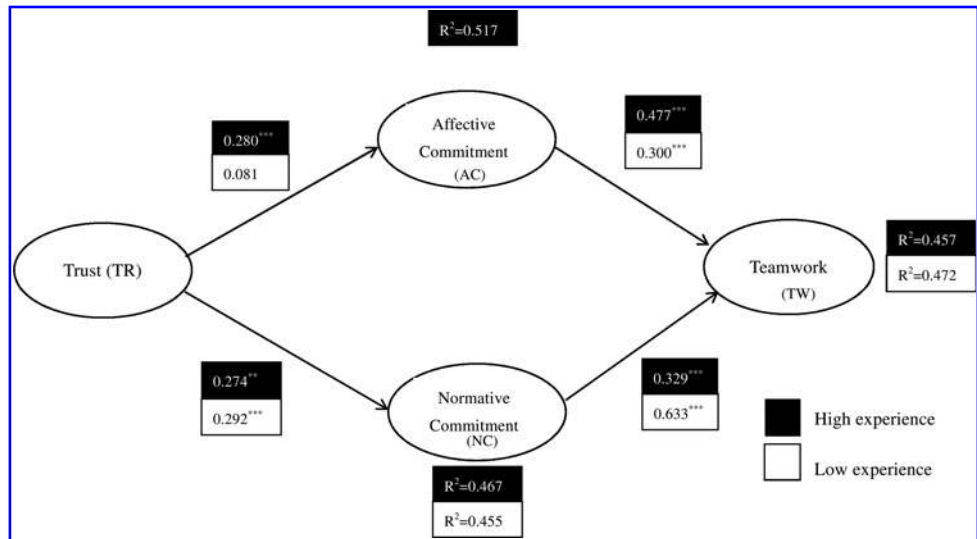
To build the teamwork model, we employed the partial least squares (PLS) approach to perform the structural

TABLE 2. SQUARE ROOT OF AVE, INTERCONSTRUCT CORRELATIONS, AND COMPOSITE RELIABILITY

Construct	No. of items	Mean	SD	CR	AVE	α	1	2	3	4
Trust	4	5.04	1.18	0.905	0.761	0.840	0.825			
Affective commitment	6	5.04	1.05	0.864	0.768	0.847	0.669	0.748		
Normative commitment	6	4.00	1.08	0.914	0.810	0.800	0.401	0.311	0.797	
Teamwork	3	5.15	1.07	0.881	0.776	0.839	0.519	0.474	0.217	0.831

Square root of AVE is on the diagonal in bold. AVE, average variance extracted; CR, composite reliability.

FIG. 2. Results of structural equation modeling.



equation modeling analysis. The analysis was implemented using PLS software—SmartPLS 2.0. Our research adopted one-tailed testing ($t\text{-value} > 1.645, p < 0.05$)³⁹ and set the resampling number at 500.

Results

To validate the effects of the hypotheses of the structural multigroup analysis, we examined the coefficients of the causal relationships between constructs. Figure 2 illustrates the paths and their significance on the structural model. In the high-experience group, as shown in Figure 2, trust explains 51.7 percent variance of affective commitment ($R^2 = 0.517$) and 46.7 percent variance of normative commitment ($R^2 = 0.467$) and finally explains 45.7 percent teamwork ($R^2 = 0.457$). In the low-experience group, trust influences teamwork significantly with normative commitment as a mediator, which explains 45.5 percent normative commitment ($R^2 = 0.455$) and 47.2 percent teamwork ($R^2 = 0.472$).

On the basis of the entire sample (Table 3), two hypotheses are significant (H1a and H2a are supported). Regarding the moderating effects of experience, the influence of trust on

affective commitment is stronger for players with high experience than for those with low experience (H1a is supported); however, the influence of trust on affective commitment is not stronger for players with high experience than for those with low experience (H1b is not supported). Consequently, the influence of affective commitment on teamwork is stronger for players with high experience than for those with low experience (H2a is supported), while the influence of normative commitment on teamwork is not stronger for players with high experience than for those with low experience (H2b is not supported).

Further analysis of indirect and direct effects was performed as shown in Tables 4 and 5. For the high-experience group, the decomposition first indicates that the mediated effect of trust on teamwork through affective commitment (50.54 percent) is substantially stronger than that through normative commitment (49.46 percent). For the low-experience group, the decomposition in Table 5 also indicates that the mediated effect of trust on teamwork is through normative commitment (100 percent) rather than affective commitment (0 percent).

Finally, to compare the path coefficients of hypothesis testing as well as the moderating effect, hypotheses were

TABLE 3. COMPARISON OF THE PATH COEFFICIENTS IN BOTH SAMPLES

Hypothesis		High-experience group (n ₁ = 155)		Low-experience group (n ₂ = 141)		t-Value comparing the two groups	High experience vs. low experience	Conclusion
		Coefficient	Stand error	Coefficient	Stand error			
H1a	TR → AC	0.28	0.096	0.081	0.076	19.64**	H > L	Supported
H1b	TR → NC	0.274	0.041	0.292	0.055	-3.21*	H < L	Not supported
H2a	AC → TW	0.477	0.115	0.3	0.074	15.58**	H > L	Supported
H2b	NC → TW	0.329	0.123	0.633	0.071	-25.71**	H < L	Not supported

*Significant at the $p < 0.05$ level.

**Significant at the $p < 0.01$ level.

TR, trust; TW, teamwork; AC, affective commitment; NC, normative commitment.

In the following equations, n_1 = high-experience group and n_2 = low-experience group.

$$s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

$$t_{(n_1 + n_2 - 2)} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{s_p^2(1/n_1 + 1/n_2)}}$$

TABLE 4. ANALYSIS OF INDIRECT EFFECTS IN THE HIGH-EXPERIENCE GROUP

Path	Indirect path			Total effects	
	Affective commitment	Normative commitment			
Trust → Teamwork	0.280	50.54%	0.274	49.46%	0.554

examined by comparing the path coefficients referencing Fornell and Larcker.³⁸ Therefore, this study performed standard error estimates from each resampling in a parametric sense via *t*-tests. All *t*-values comparing the two groups are significant above the 0.05 level and are shown in Table 3. As shown in Figure 3, the slope indicates that the affective commitment varies more for players with the high-experience group, while Figure 4 shows that the normative commitment varies more for players with the low-experience group.

Discussion and Implication

To our best knowledge, this study is the first to theoretically specify or empirically test the impacts of trust on online game players' teamwork with affective commitment and normative commitment as mediators. The results indicated that trust promotes more teamwork only for players with high experience through affective commitment than those with low experience. This finding is partially consistent with the previous research indicating that team experience offers a possible basis for effective teams.^{1,12-14,34} For example, Antin and Churchill³⁴ proposed the gamification design for social media users and also suggested that designs such as badges can increase the sense of trust of actively participating users, which results in more teamwork.

On the basis of the test results of this study, low teamwork is likely attributed to a lack of trust based on affective commitment or normative commitment. Thus, we may propose a few theoretical, managerial, and educational implications as follows. From the theoretical perspective, this article contributes to the literature on commitment and teamwork in several ways. First, it extends the research of Meyer and Allen's¹⁵ organizational commitment theory by examining trust and teamwork of players. Previous research considering attachment from a multidimensional perspective used commitment to organizational entities as independent variables and examined their relationships with various teamwork outcomes. This research focused on evaluating the influence of trust on teamwork, with affective commitment and normative commitment serving as mediators. By doing so, we identified relationships that could help explain how members with different levels of experience form teamwork in organizations.

TABLE 5. ANALYSIS OF INDIRECT EFFECTS IN THE LOW-EXPERIENCE GROUP

Path	Indirect path			Total effects
	Affective commitment	Normative commitment		
Trust → Teamwork	—	0.292	100%	0.292

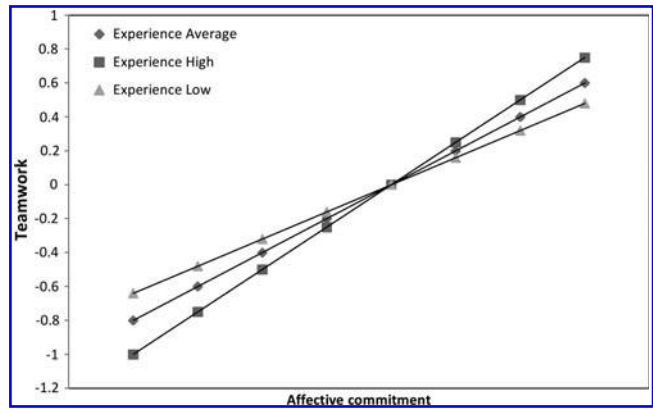


FIG. 3. Interaction between teamwork and affective commitment.

Also, this study found that team experience is valuable in constructing a theory about the nature of team structures and coordinative mechanisms that are needed to support interpersonal social systems in the online environment.

From the managerial standpoint, prior studies^{12,14,36} have considered massively multiplayer online role-playing games as effective tools for supporting group formation, maintenance, and coordination. The significant influence of affective commitment and normative commitment (i.e., mediators) on users' perception of teamwork suggests that both mediators should be taken as check points for monitoring how trust affects teamwork in the virtual work environment. Business managers should know that employees are very sensitive to any confusion about business activities in which their affective and normative commitment is weakened. When managers detect employees' low trust in the organization, they should further fortify affective and normative commitment by transcribing business activities and verifying such activities as corporate culture to the employees in order to win their trust. Also, when forming different project teams, managers can use prior team experience for selecting employees to promote teamwork and reduce potential conflicts.

For the educational side, this study explored the role of affective commitment and normative commitment in strengthening participants' teamwork. This result represents the development of effective social bonds, which may

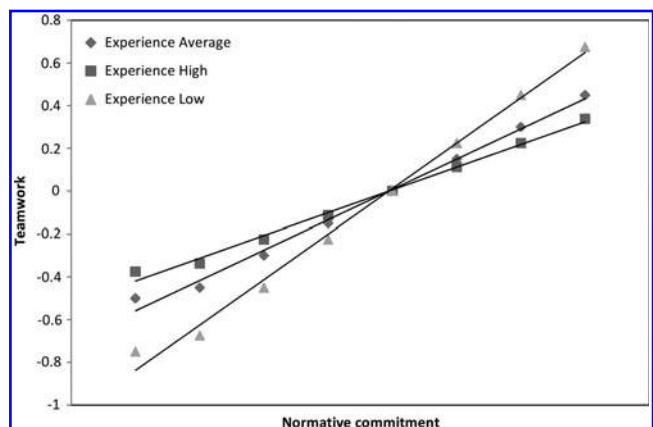


FIG. 4. Interaction between teamwork and normative commitment.

promote the emergence of an online community of practice. Through this community of practice, all members can form a joint team with a mutual engagement to develop a shared repertoire of knowledge and competencies together. Also, the result may increase the understanding of learner-to-learner interaction in the situated learning context. For instance, the result implied that participants with high experience are more sensitive to such an influence, and they will display greater willingness to conduct teamwork with other team participants. Instructors may accordingly assist learners to maintain long-term affective relationships such as online learning families to enhance their teamwork.

Some limitations of this research should be noted. First, the research design was nonexperimental. Regardless of the sophistication of the statistical techniques, causal inferences must be treated with extreme caution when using nonexperimental designs. Although the results are consistent with prior research and the hypothesized model, causal inferences should be withheld. Second, the respondents were mostly male (78 percent). Differences in how men and women are socialized may affect the team environment experiences and the willingness to commit to teams or organizations.

Conclusions

The need for teamwork has grown significantly in today's organizations. On the basis of the theoretical framework of teamwork and organizational commitment theory, a conceptual model was proposed in this study to examine the impacts of trust on players' teamwork via affective commitment and normative commitment. Results showed that trust facilitates more teamwork only for players with high experience through affective commitment than those with low experience. Findings of this research add to the current understanding of the mechanism behind teamwork in organizations and online communities.

Author Disclosure Statement

No competing financial interests exist.

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