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ARTICLE

Negotiations for meaning in the context of a massively multiplayer online role-playing game

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Abstract

This study investigated negotiations for meaning as conditions for second language (L2) learning in the context of a massively multiplayer online role-playing game, World of Warcraft (WoW) (Blizzard Entertainment, 2004). Varonis and Gass's (1985) and Smith's (2003a) models were used to identify negotiation episodes during on-task and off-task talks among the participants while playing WoW. The participants were six non-native (NNS) and one native English speaker (NS). The NNSs were divided into two teams of three: Team 1 (T1) pre-intermediate and Team 2 (T2) upper-intermediate. The NS played the game with both teams. The study lasted for six months and resulted in 59.96 hours of recorded audio and nine hours of screen-recorded gaming sessions. Negotiation patterns were compared across the L2 proficiency levels and three different types of dyads. The results revealed that (a) T1 encountered more communication breakdowns, but T2 engaged in more negotiations, (b) T1 engaged in more complex negotiations, (c) breakdowns and negotiations occurred more during off-task talk, and (d) breakdowns were triggered more by the NS's utterances in T1 and by NNSs' utterances in T2. The results also showed the participants' abundant L2 use to undertake authentically contextualized game-driven tasks, meticulous involvement in bi- and multi-lateral negotiations, and creative strategies to resolve incomprehension.

Keywords: *Negotiation for Meaning, Negotiated Interaction, Massively Multiplayer Online Role-playing Games, Second Language Learning*

Language(s) Learned in This Study: *English*

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Introduction

"Virtual game worlds" (Kaplan & Haenlein, 2010, p. 60) are an emerging form of online social media that have become a part of many individuals' daily lives around the globe (Yee, 2006). As a type of virtual game world, massively multiplayer online role-playing games (MMORPGs) afford highly interactive two- or three-dimensional persistent virtual worlds, in which thousands of players, located in different parts of the globe, can interact, collaborate, and compete simultaneously. Researchers (e.g., Dixon & Christison, 2021; Palmer, 2010; Peterson, 2010b, 2012b; Rama et al., 2012; Reinhardt, 2021; Thorne, 2008) have strongly held that commercial off-the-shelf (COTS) MMORPGs provide ample opportunities for L2 gamers to interact with both the game and other gamers in the target language, and thereby develop critical L2 skills in an authentic communication setting. This claim is aligned with the concept of "naturalistic computer assisted language learning" (Chik, 2013, p. 835), which refers to informal L2 learning through using the language in digital environments in pursuit of leisure rather than learning interests.

A recent review (see Jabbari & Eslami, 2019) revealed that the current literature on second language acquisition (SLA) in the context of COTS MMORPGs has examined a wide range of topics. Among them, the most frequently visited are: (a) L2-related motivational and affective factors (e.g., Horowitz, 2019; Lee & Gerber, 2013; Peterson, 2010a, 2010b; Zheng et al., 2009a), (b) improving L2 (predominantly

vocabulary) skills (e.g., Bytheway, 2014; Rankin et al., 2009; Zheng et al., 2015), (c) developing communicative competence (e.g., Dixon & Christison, 2021; Peterson, 2010b), (d) affordances of MMORPGs for second language and culture learning (e.g., Rama et al., 2012; Zheng et al., 2009b), and (e) L2 production (e.g., Reinders & Wattana, 2011, 2015a). Like Peterson (2016), Jabbari and Eslami (2019) confirmed that *negotiation for meaning* (NfM) is still among the under-researched topics in the literature of SLA through MMORPG play. Despite an increasing interest in MMORPGs as potential venues for L2 development through interactions within and/or beyond the game environment, the complex dynamics of in-game verbal interactions have not yet been explored in detail from the psycholinguistic interactionist SLA perspective. From this theoretical standpoint, "*negotiation for meaning*, and especially negotiation work that triggers *interactional* adjustments by the NS or more competent interlocutor, facilitates acquisition because it connects input, internal learner capacities, particularly selective attention, and output in productive ways" (Long, 1996, pp. 451–452).

Like any other technology-enhanced language learning platform, MMORPGs need to be evaluated in terms of their potential for L2 learning. This study sought to assess this potential in the context of an MMORPG (i.e., *World of Warcraft*; henceforth, *WoW*; Blizzard Entertainment, 2004) by examining one of the cognitive conditions for SLA (Chapelle, 2001; Jabbari, 2021; Skehan, 1998)—the occurrence of a "conversational focus on form" that involves "negotiation of meaning" (Ellis et al., 2001, p. 284). Studying NfM in the context of WoW with its distinctive technical features, social affordances, cultural norms, and affective dynamics can advance our understanding of the SLA potential of MMORPGs (Newgarden et al., 2015; Reinders & Wattana, 2015a). In this study, NfM is investigated in a highly interactive social setting, in which meaning is authentically contextualized and can potentially be (co)(re)constructed via multiple modes of communication. To this end, the negotiated interactions occurring during MMORPG play between a native English speaker (NS) based in the United States and two teams of pre-intermediate and upper-intermediate proficiency level English speakers (NNSs) based in Iran were documented and characterized in detail. The quality and quantity of NfM episodes were compared in two different types of in-game conversational exchanges: (a) on-task talk, which pertained strictly to gameplay activities, and (b) off-task social talk, which bore no apparent relationship to the participants' in-game activities. Differences in the focus and style of these two conversation types are hypothesized to have influenced the characteristics, dynamics, and frequency of the participants' NfM.

Contrary to off-task social talk, on-task talk involves multimodal discourse or "visually presented language" (Herring, 2001, p. 612). This means gamers are constantly involved in blending a multitude of different modalities for both verbal and non-verbal communication, which are afforded by the game environment to (re)construct and interpret meaning. MMORPG players encode and decode "multimedia-enriched message content[s]" (Ensslin, 2012, p. 17) by drawing on language, as well as on various multimodal representations of meaning in the game environment (e.g., still and moving images, background sound and music, and avatar-embodied paralinguistic cues, such as gestures, postures, and proxemics). However, these multimodal representations of meaning afforded by the game's virtual setting cannot contribute much to the interlocutors' meaning-making efforts during off-task social talk with topics unrelated to in-game activities. By considering the distinction between on- and off-task talk during gameplay, this study intends to characterize the NfM that occurs among an NS and three NNSs of English in each team during MMORPG play in an English-as-a-foreign-language (EFL) context by addressing the following research questions:

RQ1: Is there any association between L2 proficiency and (a) the frequency of breakdowns, (b) the frequency of negotiations, (c) the complexity level of negotiation routines?

RQ2: Is there any association between type of turns (on-task and off-task) and (a) the frequency of breakdowns, (b) the frequency of negotiations?

RQ3: Is there any association between the frequency of breakdowns and the type of dyad:

- ($NS_{trigger} \rightarrow NNS_{signal}$), when the NS's utterances triggered breakdowns
- ($NNS_{trigger} \rightarrow NS_{signal}$), when the NNS's utterances triggered breakdowns
- ($NNS_{trigger} \rightarrow NNS_{signal}$)

RQ4: What are the patterns of triggers, indicators, responses, and reactions to the responses across the three dyads in T1 and T2?

Literature Review

Negotiation—with its emphasis on the comprehensibility of message between interactants—has inspired a rich body of SLA research. This body of research has focused on the contribution of interactional modification (Long, 1996) in promoting conditions that have been claimed to facilitate the development of grammatical competence. These conditions include (a) comprehension of L2 input (e.g., Krashen, 1985), (b) production of modified output prompted by either form-focused negotiation work (e.g., Swain, 1985) or corrective feedback (e.g., Gass & Varonis, 1989), and finally, (c) attention to L2 form (or noticing the gap in one's interlanguage) (e.g., Schmidt, 1990). These conditions and their impacts on L2 learning have been widely investigated in both face-to-face (e.g., Ellis et al., 2002; Foster & Ohta, 2005; Loewen, 2005; Pica, 1994) and computer-mediated communication contexts (e.g., Chen, 2018; Kim, 2017; Saito & Akiyama, 2017; van der Zwaard & Bannink, 2014, 2016; Yanguas & Bergin, 2018). However, this line of research has not yet been pursued as rigorously in the context of virtual game worlds (e.g., MMORPGs). Peterson (2016) believes that more research is warranted to investigate the affordances of MMORPG play for eliciting forms of interaction, such as negotiation for meaning, that are hypothesized to have a central role in SLA. Some studies (e.g., Dixon & Christison, 2021; Peterson, 2012a, 2012b; Thorne, 2008; Zheng et al., 2009b; Zheng et al., 2012) revealed that conversational exchanges during MMORPG play could provide opportunities for L2 learners to negotiate meaning in the target language and to utilize communicative strategies to bridge communication gaps. For example, Zheng et al. (2012) identified negotiating meaning and understanding other's perspectives as the second most frequently used communicative activities during WoW gameplay. To our knowledge, no studies have yet been dedicated to a detailed examination of the quality and the quantity of negotiated interactions among interlocutors in the context of COTS MMORPGs.

Dixon and Christison (2021) observed that playing *Guild Wars 2* provided opportunities for L2 gamers to engage in the negotiations triggered by (a) player-produced input (i.e., text messages exchanged among the gamers) and/or (b) environmental input (i.e., any visual, aural, and textual artifact with which a gamer interacts). They found that requesting and checking information were the most prominent communication strategies for negotiating both types of input. Requesting information to negotiate environmental input helped L2 gamers work out in-game tasks' details via pooling information, which, in turn, helped them design and implement plans to accomplish in-game tasks.

Peterson (2012a) investigated significant features of EFL learners' text-chat interactions in the context of the MMORPG *Wonderland*. His results echoed Dixon and Christison's (2021) findings to a great extent. The learners utilized requests for assistance and two forms of *continuers* (i.e., questions and confirmation checks) to maintain states of intersubjectivity during the gameplay. Foster and Ohta (2005) defined a *continuer* as "an utterance that shows that the talk is *un*problematic, prompting the speaker to go on" (p. 411). Peterson (2012a) also observed that the learners used requests for clarification when communication problems arose. Peterson (2012b) examined participants' interaction management strategies in the context of the MMORPG *Ninerift*. Discourse analyses of the participants' text-chat transcripts revealed that communication was halted occasionally during gameplay but did not result in NfM. Peterson (2012b) claimed that successful application of adaptive discourse management strategies (e.g., emoticons, suspension dots, quotation marks, and split turns) "facilitated the consistent production of coherent TL [target language] output" (p. 89). He speculated that short gaming sessions, the real-time nature of interactions, the urgency to keep up with scrolling messages, the participants' shared first language (L1), and the importance (in Japanese culture) of maintaining status among peers by not displaying ignorance could have been reasons the participants avoided NfM.

Thorne (2008) studied multilingual communication in WoW, focusing on both in-game and game-related interactions. He collected data from a gaming session between an NS of English living in the United States

and a Russian speaker living in Ukraine. His analysis of naturally-occurring conversations between the participants revealed beneficial instances of target language interactions, that is, "negotiation, repair sequences, explicit corrective feedback, and requests for assistance" (p. 322).

The current study diverts from the body of research conducted to date to examine NfM in *game-enhanced* (Reinhardt, 2019; Reinhardt & Sykes, 2012) L2 learning environments. It assesses the presence and describes the nature of NfM within a cross-cultural MMORPG-mediated communication setting in which (a) the L2 is used in an authentic communication setting primarily for the purpose of gaming; (b) gamers interact not only with other gamers but also with a multitude of virtual artifacts within the game environment; (c) verbal and nonverbal interactions take place in a multimodal, avatar-embodied communication setting; and (d) L2 gamers are collaboratively involved in performing a coherent body of diverse tasks synchronized to complete quests[1].

The Study

Study Setting

The participants played the game from home using their personal computers. They were instructed to (a) play the game collaboratively as a team, (b) continue playing as long as the whole team could stay in the game, and (c) communicate orally using an external audio channel provided by TeamSpeak3®, which is a Voice-over-Internet Protocol software. In an attempt to simulate an informal learning condition and to observe the participants' natural L2 behavior during gameplay, no other instructions were provided. All activities, discussions, interactions, and negotiations occurred naturally as the participants played the game. The participants played mostly in the player-versus-environment realm, where the focus was on defeating game-controlled monsters and completing quests in collaboration with other players. They also played in the player-versus-player realm, competing against other similarly capable gamer teams in battlegrounds.

Design

This study was observational (Plonsky & Gass, 2011) and descriptive (Seliger & Shohamy, 1989) in nature. It was designed to systematically observe and describe a naturally-occurring phenomenon, that is, NfM during WoW gameplay, as a condition that has long been claimed to be facilitative of the SLA process. Through observing and conducting a focused analysis of the NfM episodes during gameplay, this study exploited a process-oriented design (Chapelle, 2001) to provide tentative evidence for the potential of a COTS MMORPG for SLA. To this end, this research incorporated insights from the interactionist approach (Gass & Mackey, 2007) to SLA and a discourse-analytic perspective to characterize the NfM within naturally-occurring conversational exchanges during WoW gameplay.

The components of each negotiation routine were characterized and quantified using frequency measures. The results were interpreted in light of the data obtained through multiple methods of data collection (i.e., audio- and screen-recording of gameplay, interviews, and reflective notes). Therefore, the current research benefits from a parallel mixed design (Teddlie & Tashakkori, 2009) to cross-validate or corroborate findings obtained from two sets of quantitative and qualitative data analyses.

Participants

The participants were six NNSs of English based in Iran and one NS of English based in the United States. They were recruited through invitation-to-participate letters posted on the first author's Facebook page. Upon receiving emails from potential participants (three NSs and 24 NNSs), the first author contacted them to provide more information. At this stage, two NSs and 12 NNSs were screened out as scheduling conflicts prevented them from participating. One NS, an expert WoW-player based in the United States, agreed to participate. After the initial screening, the first author (a) checked the NNSs' accessibility to the technical infrastructure required for playing the game on a European server and (b) determined their English language proficiency using an English language placement test. At this stage, six more candidates were screened out, as three of them could not meet the technical requirements, and the other three had advanced English

language proficiency. The remaining six NNSs were all male undergraduate students, ages 23 to 25, who had played MMORPGs in English on European servers. They signed the consent form and agreed to complete 30 hours of collaborative gameplay. Based on placement test results, they were divided into two teams of three: T1 for pre-intermediates (between A2 and B1) and T2 for upper-intermediates (approximately B2). The NS participated in both teams. To protect participants' confidentiality, we used the pseudonym Nate for the NS, double initials for the NNSs on T1, and single initials for T2.

Data Collection

The data were collected over a period of six months and consisted of approximately 60 hours of audio- and nine hours of screen-recorded[2] gaming sessions, post-study semi-structured one-on-one interviews, and the NNSs' reflective notes written and shared immediately after each gaming session. T1 completed 29.58 hours of gameplay over 14 sessions, and T2 completed 30.38 hours of gameplay within 15 sessions. To communicate during gameplay, the participants used TeamSpeak3®, which allowed them to speak simultaneously without having to take turns. To minimize the influence of an observer's presence on participants' language behavior and to obtain more authentic data, the NS was asked to audio- and screen-record the gaming sessions.

Data Analysis

Units of Analysis

As the basic units of analysis, episodes of NfM were identified, characterized, and quantified by drawing primarily on two main frameworks proposed by Varonis and Gass (1985) and Smith (2003a) (see Table A1 in Appendix A). Varonis and Gass (1985) defined negotiation routines as exchanges that *push down* interactants from the main line of discourse to resolve a communication breakdown (hereafter 'breakdown') and *pop* them back *up* to the main stream of discourse when the problem is resolved. A negotiation routine, according to Varonis and Gass (1985), comprises four main functional components: (a) trigger, (b) indicator, (c) response, and (d) reaction to the response. A trigger (T) is an element (lexical, phonological, morphosyntactic, or pragmatic) in an interlocutor's discourse that prompts a breakdown during a verbal interaction. An indicator (I) is a signal (implicit or explicit) of misunderstanding, no understanding, or incomplete understanding of the whole or a part of the discourse. A response (R) is an attempt on the part of an interlocutor to bridge a communication gap by implementing a single or a combination of different communication modes (i.e., linguistic, visual, aural, gestural, spatial). Lastly, a reaction to the response (RR) indicates whether or not the communication problem has been resolved and the temporarily interrupted discourse with interlocuters can be resumed. Smith (2003a) added two components to this model: *confirmation* (C) and *reconfirmation* (RC). When an RR indicates—explicitly or implicitly—that the response clarifies the meaning and hence resolves the breakdown, the interactants return to the main trajectory of the conversation. In such cases (of successful negotiation), the RR (RR+) can be followed by a positive confirmation (C+). Reconfirmation is the final, though optional, phase of negotiation. Like a positive, explicit, and minimal reaction to a response, reconfirmation consists of a single word, such as *OK*, *Good*, *Right*, *Yes*, and *Thanks* (see Example 1). In this research, a single unit of analysis is an episode of NfM composed of a sequence of three essential and three optional components, that is, T→I→R→(RR)→(C)→(RC) (see Examples 3, 4, and 7). As these two frameworks could not encompass all the types of Ts, Rs, and RRs identified in our data, we provide the additional types that emerged from our data in Table A2.

Analysis of the Negotiation Routines

In the first step, all conversational turns[3] were tallied and classified into two categories based on their topics: *on-task* and *off-task*. Then, instances of breakdown and NfM were tallied separately across on- and off-task conversational turns. Finally, the distribution of simple and complex negotiation routines was explored for each team. Following Ellis et al. (2001), an episode of NfM was considered as *simple* when it involved a single exchange (i.e., T→I→R→(RR+)→(C+)→(RC); see Examples 3, 4, and 7) and as *complex* when the interlocutors' first round of negotiation to resolve a communication problem failed and was immediately

followed by a new round of negotiation (see Example 1).

Example 1

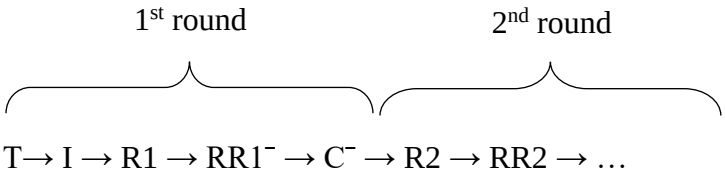
A Complex Episode of NfM

MM:	Nate! Do you buy legion /ˈleʒɪɔːn/?	(T)
Nate:	I'm sorry! Could you repeat that please?	(I1)
MM:	Do you buy legion /ˈleʒɪɔːn/? Legion /ˈleʒɪɔːn/ patch?	(R1)
Nate:	Did I buy …?	(RR1⁻/I2)
MM:	Legion /ˈleʒɪɔːn/ patch; next patch.	(R2)
Nate:	Oh, legion /ˈliːʤən/! No, I have not purchased legion yet. I intend to. It's not coming out until August, though. So, I have a little bit of time before I need to pay for it.	(RR2+)
MM:	I see.	(C+)
Nate:	Ya!	(RC)

In these cases, the first RR (denoted by RR⁻) plays the role of a new indication (I) of non-understanding (see Figure 1). It should be noted that a complex negotiation routine was counted as one unit although it contains two or more *rounds* of negotiations.

Figure 1

A Complex Episode of NfM Composed of Two Rounds of Negotiation



In the second step, total frequencies of breakdowns were calculated separately for three possible dyads: $NS_{trigger}$→$NNS_{indicator}$, $NNS_{trigger}$→$NS_{indicator}$, and $NNS_{trigger}$→$NNS_{indicator}$. In the final step, the frequencies of different types of Ts, Is, Rs, and RRs were calculated for each dyad and compared between Teams 1 and 2. These calculations let us investigate the opportunities that NfM created for L2 gamers to obtain more comprehensible input and produce more comprehensible output.

There were 23 cases in T1 and 16 cases in T2 where coding Ts and RRs was not straightforward due to a lack of objectively verifiable evidence in the data[4]. In these cases, we applied stimulated recall a month after data collection ended as an introspective method of elicitation (Gass & Mackey, 2017). The participants were asked to listen to the audio-recordings and let us know what type(s) of trigger interrupted the communication flow, and whether their RR moves indicated their comprehension of the discourse.

Analysis of the Interviews and Reflective Notes

The interviews and reflection journals were analyzed inductively for themes and recurring patterns of meaning. We used thematic analysis, following the procedure recommended by Creswell (2015). First, we conducted a "preliminary exploratory analysis," which consists of "exploring the data to obtain a general sense of the data, memoing ideas, thinking about the organization of the data, and considering whether you need more data" (Creswell, 2015, p. 242). Then, we conducted "open coding," which "constitutes the first level of conceptual analysis of the data" (Dörnyei, 2007, p. 260), to explore ideas and meaning embedded

in the data. At this stage, we identified text segments, highlighted them, and assigned a code word/phrase that describes the meaning of the text segments. As Dörnyei (2007) explained, in the process of open coding, "the textual data is 'broken open' into chunks whose length usually varies between a long phrase, a line, a sentence, or even a short paragraph" (p. 260). Following open coding, we reduced the list of codes to a more manageable number by grouping similar or closely related codes. We revisited the data to circle specific quotes that support the codes and see whether new codes emerged. Finally, we aggregated similar codes to develop themes or broad categories of ideas. All interview transcripts and reflective notes were coded independently by the first author and a second coder, who also randomly coded 50% of the negotiation episodes. Inter-rater reliability—using Cohen's Kappa (Cohen, 1960)—was calculated for the interviews and reflective notes ($\kappa = 0.90$) as well as for the four components of the negotiation episodes: triggers ($\kappa = 0.88$), indicators ($\kappa = 0.98$), responses ($\kappa = 0.85$), and reactions to the responses ($\kappa = 0.95$). The cases of disagreement were discussed and resolved between the coders.

Results

Associations between L2 Proficiency and the Frequency of Breakdowns, the Frequency of Negotiations, and the Complexity Level of Negotiation Routines

As Table A3 exhibits, the results revealed that T1 produced 8,432 conversational turns, encountered 195 instances of breakdown (constituting 2.3% of the total turns), negotiated most of these instances successfully (89.2%), and that the negotiation routines were mostly simple (83.3%). In contrast, T2 produced more conversational turns with fewer instances of breakdown. However, following a pattern similar to T1, T2 encountered breakdowns in a very small percentage of their total turns (1.0%), negotiated most of the breakdowns (98.0%), and engaged more in simple than complex negotiations (91.7%). Further analyses revealed that 9.4% (792 turns) of T1's and 4.3% (433 turns) of T2's total conversational turns were dedicated to NfM (see Table A5).

Chi-square tests revealed statistically significant yet weak associations between the participants' L2 proficiency and the frequencies of breakdown and NfM. However, the association between L2 proficiency and the complexity level of NfM was insignificant (see Table A3). It is noteworthy that the sensitivity of Chi-square test to sample size may have produced a small *p* value for the association between L2 proficiency and frequency of breakdowns (Lin et al., 2013; Plonsky & Oswald, 2014). The significant standardized residuals[5] (z =5.3, z = -4.9) suggested that T1 encountered more, but T2 experienced fewer breakdowns than expected. The significant standardized residual for unnegotiated turns in T2 (z = -2.1) suggested that the frequency of unnegotiated breakdowns was smaller than expected. The odds ratio also showed that the odds of negotiating a breakdown were 5.8 times higher among the participants in T2. The data showed that negotiations were predominantly simple (83.3% in T1 and 91.7% in T2) and that T1 engaged in more complex negotiation routines than T2, although the association between L2 proficiency and NfM complexity level was not statistically significant.

Associations between Types of Turns and the Frequencies of Breakdown and Negotiations

As Table A4 displays, the participants in both teams devoted most of their conversational turns (70.8% in T1, 72.2% in T2) to on-task topics. However, quite similarly, they experienced more instances of breakdown (3.4% in T1, 1.5% in T2) and engaged in more negotiations (96.4% in T1, 100% in T2) during off- than on-task talk.

Chi-square tests showed similar results for both teams, that is, significant but weak associations between types of turns and the frequency of breakdowns (see Table A4). The sensitivity of the chi-square test to sample size may have produced such a small *p*-value. The significant standardized residuals for frequencies of breakdowns during on-task talk (z=-2.2) and off-task talk (z=3.5) indicated that T1 experienced fewer breakdowns than expected during on-task but more breakdowns than expected during off-task talk. A similar pattern emerged for T2 with a significant standardized residual (z=2.8) for the frequency of

breakdowns during off-task talk.

A Chi-square test showed a significant but weak association between types of turns and the frequency of NfM for T1 (see Table A4). The significant standardized residual for the frequency of unnegotiated breakdowns during off-task turns (z=-2.0) indicated that the frequency of unnegotiated turns during off-task talk was smaller than expected. The odds ratio also indicated that the odds of negotiating a breakdown were 5.1 times higher during off-task talk. The independence of association could not be tested for T2 as the frequencies of unnegotiated breakdowns in both on- and off-task talks were too small to meet the expected cell counts.

Association between the Frequency of Breakdowns and Types of Dyad

The results showed that the NS's utterances triggered most of the breakdowns (55.9%) in T1, whereas in T2, most of the breakdowns (44.9%) were triggered by the NNSs' utterances in $NNS_{trigger}$→NS_{signal} dyads. A Chi-square test revealed a significant but weak association between the frequency of breakdowns and types of dyads (see Table A6). The results of a post-hoc test of independence[6] (Garcia-Perez & Nunez-Anton, 2003) showed significant *p* values ($p < .0083$) for $NNS_{trigger}$→NS_{signal} dyads in both teams. More precisely, in T1, fewer, but in T2, more breakdowns than expected were triggered by the NNSs' utterances; that is, the breakdowns were triggered mainly by the NS's utterances in T1 but by the NNSs' utterances in T2.

Patterns of Ts, Is, Rs, and the RRs

Triggers

Fast speaking rate, vocabulary, and content were, in that order, the most prominent triggers of $NS_{trigger}$→NNS_{signal} negotiations in both teams (see Table A7). Following the literature (e.g., Ellis et al., 2001), we labeled a trigger as *fast speaking rate* whenever the high tempo of the NS's speech was identified as triggering non-understanding. In such cases, the content of the message was clear, and its syntactic and lexical complexity seemed unlikely to be of any challenge to comprehension considering the NNSs' L2 proficiency level. Speaking rate is expressed in words per minute (wpm) and is defined by Laver (1994) as including "[…] all speech material (linguistic or non-linguistic), together with any silent pauses, that are contained within the overall speaking-turn" (p. 158). According to the National Center for Voice and Speech (n.d.), the average speaking rate in a conversation for English speakers in the United States is between 120 and 150 wpm. When the NS's fast speaking rate was detected as the trigger of NfM, the speaking rate was calculated using PRAAT software (Boersma & Weenink, 2013) as an average of 240 wpm in T1 and 274 wpm in T2.

Other trigger types triggered 12.8% of the negotiations in T1 and 15.0% in T2. These triggers included unexpected pronunciation, pragmatics, discourse, distracted attention, sudden topic change, and syntax in T1, and unexpected pronunciation, discourse, and distracted attention in T2. *Unexpected pronunciation* applied when the NNSs failed to decipher a word (or a phrase) and hence failed to understand its meaning when it was pronounced differently from what they had expected (see Example 2).

Example 2

Unexpected Pronunciation

M:	I think she is a girl … and I think she is really high in level.	
Nate:	Umm I don't know.	
M:	She just kill and run.	
Nate:	Is that the … the **gnome** … or the **Night Elf**?	(T)
M:	What? Pardon?	(I)

In Example 2, the pronunciation of "gnome" and "Night Elf" triggered the NfM. Here, M knew the words

but expected to hear /gəˈnəʊm/ instead of /nəʊm/ and /ˈnaɪt ˈelf/ instead of /naɪˈelf/. The examination of M's preceding conversational turns revealed his regular use of these words but with incorrect pronunciations. During later conversational turns, Nate corrected M's pronunciation of "gnome" by explicitly explaining that the letter 'g' is silent in the word 'gnome,' and the letter 't' is sometimes omitted when the phrase 'Night Elf' is pronounced casually.

Distracted attention applied when an interactant's attention was temporarily distracted from the main topic of the discourse—often due to an emerging urgency in the game. Finally, when communication halted temporarily due to an unexpected (i.e., with no prior notice) discourse topic change, the trigger was labeled as 'sudden topic change' (Toyoda & Harrison, 2002, p. 86).

The most frequent trigger types followed the same pattern across $NNS_{trigger}$→NS_{signal} and $NNS_{trigger}$→NNS_{signal} negotiated interactions. Mispronunciation, content, and vocabulary were, in order, the most frequently recurring trigger types in both teams (see Table A7). When the NNSs' erroneous or indistinguishable pronunciation caused incomprehension and hence disrupted the flow of the discourse, the trigger was coded as *mispronunciation* (see Example 3).

Example 3

Mispronunciation

MM:	So, I think you don't have a **garrison** /ˈgreɪsɔːn/. Is that right?	(T)
Nate:	I don't have a WHAT?	(I)
MM:	**Garrison**, **garrison** /ˈgærɪsɔːn/.	(R)
Nate:	All I have … I have two characters that have their **garrison** /ˈgerəsˠn/.	(RR)
MM:	Oh, you have the **garrison** /ˈgerəsˠn/?	
Nate:	Ya, my Mage is level umm 96 or 97.	

In Example 3, MM's mispronunciation of the word 'garrison' (line 1) triggered the NfM. In line 3, MM corrected himself partially. That helped Nate decipher the word. In line 5, MM fine-tuned his pronunciation by copying Nate's pronunciation successfully.

Other trigger types in $NNS_{trigger}$→NS_{signal} negotiations included discourse, distracted attention, pragmatics, and syntax in T1, and syntax, pragmatics, discourse, distracted attention, and sudden topic change in T2. They triggered 11.1% and 34.1% of cases of incomprehension in T1 and T2, respectively. In $NNS_{trigger}$→NNS_{signal} negotiations, 15.6% and 14.3% of cases of incomprehension in T1 and T2, respectively, were triggered by other trigger types (i.e., discourse, pragmatics, syntax, and sudden topic change in T1 and discourse and pragmatics in T2).

Indicators

The analyses revealed that explicitly made global and local clarification requests (CRs) were, in that order, the two most frequently recurring indicator types across the three dyads in both teams (see Table A8). Instances of incomprehension were also signaled by other indicator types, including explicit local confirmation check (CC), inappropriate response, and explicit inferential. There were very few cases (two in T1 and one in T2) in which the breakdowns were not indicated—at least verbally.

Responses

Only the first response (R1) moves were analyzed in this study. The results suggest that (a) the participants were creative in their attempts to improve discourse comprehensibility, (b) most of the R1 moves were hybrid in nature, involving two or more strategy types listed in Table A1 (see Example 4), and (c) very few signals of incomprehension were ignored (or at least did not receive any immediate or delayed verbal responses) (see Example 5).

Example 4

Hybrid Response Strategy

Nate:	We can go kill a bunch of those black bores and stuff just outside of the South of the town. That'll level him up pretty fast. (27 words/5 seconds)	(T)
MM:	Really this is very fast you say it, and I can't understand {what do you} what do you say it.	(I)
Nate:	Sorry about that! We can go kill **some** bores … {South of} South of town here … and that'll level him up. (21 words/10 seconds)	(R)
MM:	Uh-huh! It's good idea.	(RR+)

In Example 4, as explicitly acknowledged by MM, Nate's fast speaking rate triggered the NfM. In response, Nate attempted to resolve the breakdown by utilizing reduction, rephrasing (lexical), and speaking rate modification strategies. Nate reproduced his utterance by deleting the phrases 'and stuff just outside of the' and 'pretty fast;' he replaced the phrase 'a bunch of' with 'some' and implanted intentional pauses (denoted here by '…') within his utterance to slow down his speaking rate (from 324 to 126 wpm).

Example 5

A Negotiation Routine with no Response

Nate:	Those are some cool weapons you got Hard Die[a].	(T)
MM:	What, what? I can't understand … tell me.	(I)
Nate:	We should go up to the Lumber Mill. We shouldn't stay here.	(No R)
MM:	OK.	

Note. [a] Hard Die is the name of MM's avatar.

In both teams, expansion, rephrasing, and repetition with a slower speaking rate (i.e., an average of 139 wpm in T1 and 155 wpm in T2) were the most frequently utilized individual response strategies by the NS (in $NS_{trigger} \rightarrow NNS_{signal} \rightarrow NS_{response}$) (see Table A9); expansion, repetition with no modification, repetition with modified pronunciation (i.e., self-corrected) (see Example 3 above), and rephrasing were the response strategies most frequently employed by the NNSs ($NNS_{trigger} \rightarrow NS_{signal} \rightarrow NNS_{response}$) (see Table A10); and expansion, repetition with no modification, and rephrasing were the three strategies most used by the NNSs during $NNS1_{trigger} \rightarrow NNS2_{signal} \rightarrow NNS1_{response}$ dyads (see Table A11).

Reactions to the Responses

Only the first reactions to response (RR1) moves were analyzed in this research. Like the R1 moves, RR1 moves also comprised both single and multiple strategies. Total frequencies revealed that task-appropriate response (TAR) and minimal response strategies were, in order, the first and second most frequently utilized strategies across all three dyads in both teams (see Table A12).

The results also indicated that the first rounds of negotiations were unsuccessful in only a few cases—those where the interlocutors' first reactions to the response (RR1s) served as indicators of incomprehension for subsequent rounds of negotiations. Examination of subsequent moves revealed that almost all the negotiations finally led to the resolution of the communication problems in the second or sometimes third rounds of negotiations.

A few negotiation episodes (13 in T1 and seven in T2) turned out to be opportunities for multilateral meaning-making collaboration among team members to bridge the communication gaps that initially happened between two interlocutors. There were some occasions when more than one interlocutor signaled a comprehension failure, responded to the signal, or reacted to the response(s). On such occasions, the participants were contributing to the resolution of communication problems whenever it was necessary and

appropriate (see Example 6).

Example 6

Multilateral Meaning-making Collaboration

Nate:	[….] Tell me what the picks are.	
MH:	It's a Posthaste, Narrow Scape and Crouching Tiger, Hidden Chimaera.	
Nate:	And what are the effects?	(T)
MH:	Umm … what?	(I_{MH})
Nate:	What are the effects of different powers? What do they do?	(R1)
MM:	I can't understand what do you mean Nate.	(I_{MM})
Nate:	Read me the description of each of the powers.	(R2)
MM:	Uh-huh! Read the details.	(RR+)
MH:	Uh-huh! Posthaste improve my movement and for a … eight seconds. And Narrow Scape activate a web trap for eight yard and eight seconds.	(RR+)

In Example 6, the breakdown was signaled initially by MH and then by MM (following R1). After Nate's second response (R2), MM acknowledged that he understood the question (denoted by RR+); then, seeking to contribute to the comprehensibility of the discourse, MM rephrased Nate's request asking MH to 'read the details.' Giving the minimal response 'Uh-huh,' and providing a TAR that was reading the description of each power in the game helped MH to understand and react accordingly. The collaborative nature of game-driven tasks, the interdependence of activities, and the urgency of information exchange seem to have compelled the participants to pay constant attention to most of the negotiations taking place around them.

A new type of RR strategy emerged from these data. This strategy was implemented by the NNSs. It involves taking an in-game action that is pragmatically appropriate and contextually relevant to the preceding stretch of discourse. This RR strategy, which is termed here as *Task Appropriate Action* (TAA), can be considered as the nonverbal (action-based) form of the TAR strategy proposed by Smith (2003a). TAA applies when an interlocutor reacts nonverbally to a response by performing an *avatar-embodied action* as requested, suggested, or commanded in the preceding chain of discourse (see Example 7). Like TAR, TAA "implicitly show[s] a degree of understanding of the target element" (Smith, 2003a, p. 44). In other words, TAA is an implicit RR representing that the breakdown is successfully bridged. Therefore, the RR that involves TAA is a positive RR (RR+).

Example 7

Task Appropriate Action

Nate:	Hey B, I'm gonna request a signature from you real quick.	(T)
B:	Sorry?	(I)
Nate:	B, I'm requesting a signature.	(R)
B:	… [*signing the agreement to enter the battleground*]	(RR+/TAA)
Nate:	Perfect! Alright! We just need M's [signature].	
B:	Ya! OK! Thanks!	

In Example 7, the communication problem arose due to Nate's fast speaking rate (260 WPM). To resolve the issue, Nate repeated his utterance at a much slower rate (180 WPM), reduced it to its key semantic components, and rephrased it syntactically. Upon comprehending Nate's modified discourse, B reacted nonverbally by performing an action (i.e., signing an agreement in the game) that was pragmatically

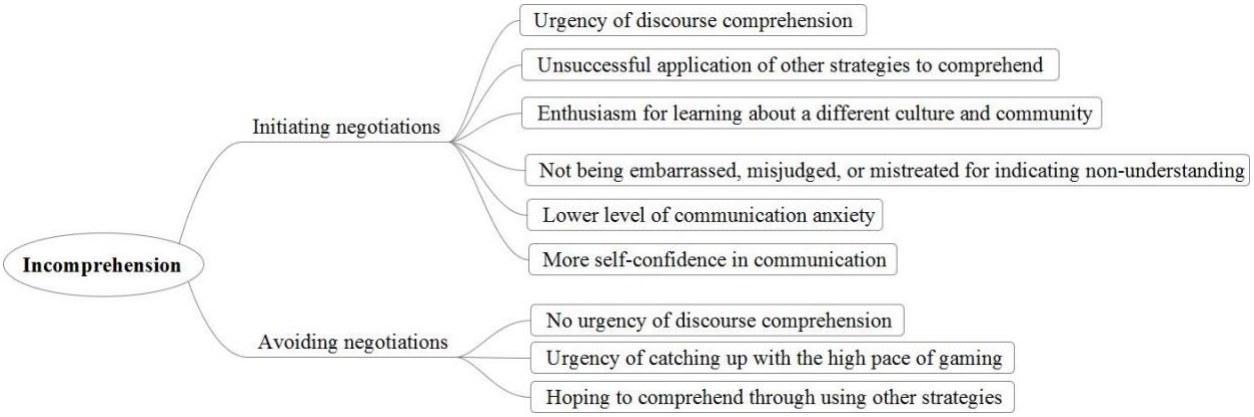
relevant to the preceding discourse.

Interviews and Reflective Notes

The analysis of interviews and reflective notes yielded nine overarching themes: (a) establishing a community of practice, (b) expert-novice gamer mentoring, (c) developing affective and social bonds, (d) decreasing communication anxiety, (e) growing self-confidence in using the L2, (f) the predominant focus on meaning, (g) willingness to communicate, (h) multimodal communication, and (i) developing intercultural awareness. To map the NNSs' negotiation behavior, we asked them to explain how they were dealing with their non-understanding during the gameplay and if there were any occasions when they pretended to have understood the meaning of the discourse. Findings are summarized in the following diagram (see Figure 2).

Figure 2

The Reasons for Initiating or Avoiding NfM



The NNSs acknowledged that the driving forces for initiating negotiations were the urgency to comprehend the discourse in critical situations (e.g., monsters' instant attacks), persistent failure to understand despite using other strategies such as drawing on in-game multimodal cues (e.g., colors, music, signs, and (re)actions), and enthusiasm to explore a different culture and community. The analyses also revealed the main reasons underlying their willingness to initiate negotiations: not being embarrassed, misjudged, or mistreated for indicating non-understanding, experiencing less anxiety, and developing self-confidence in using the L2. They also highlighted the following socio-affective factors as the promoters of positive attitudes towards negotiations for meaning: a strong sense of collaboration and teamwork, positive affective bonds, and willingness to support each other. On the contrary, they preferred not to initiate negotiations when they (a) believed that non-understanding would not affect the gameplay adversely, (b) had to catch up with the game's high pace, or (c) were attempting to comprehend by adopting some alternative strategies mentioned earlier.

Discussion

Findings suggest that the dynamic interplay among the technical (e.g., integrated verbal utterances and avatar-embodied actions, and multimodality of communication), social (e.g., interdependence and collaboration), and affective (e.g., less L2 anxiety) aspects of WoW (see Jabbari & Eslami, 2019; Voulgari et al., 2014) can contribute to the new patterns of NfM as identified in this study. One of the highlights of this study is that T1 became involved in complex negotiation routines twice as often as T2 (16.7% vs. 8.3%; see Table A5). This result was counterintuitive though predictable to some extent considering T1 NNSs' limited L2 proficiency. Their lower level of L2 proficiency seems to have imposed more challenges on them and their interlocutors to decipher and clarify the meaning of the linguistic forms that hindered the

flow of discourse. In order to meet these challenges, the NNSs in T1 spent more time processing the L2 utterances, presumably leading to higher chances of SLA.

The lower rates of communication problems during on-task turns (1.9% in T1 and 0.8% in T2) than during off-task turns (3.4% in T1 and 1.5% in T2) is another finding that is worth discussing. This finding can be partly rationalized by drawing on the rich semiotic ecology of the game (Thorne et al., 2012), which encompasses multiple verbal and non-verbal contextual features. These elements seem to have assisted the NNSs, particularly those in T1, to communicate effectively despite their limited L2 proficiency (see Excerpts 1 and 2 in Appendix B). This argument corroborates Gee's (2003) *situated meaning principle* and *multimodal principle*. According to the situated meaning principle, "the meanings of signs (words, actions, objects, artifacts, symbols, texts, etc.) are situated in embodied experience. Meanings are not general or decontextualized" (Gee, 2003, p. 107). The multimodal principle states, "in video games, meaning, thinking, and learning are linked to multiple modalities (words, images, actions, sounds, etc.) and not just to words" (Gee, 2003, p. 108). Therefore, higher rates of breakdowns during off-task talk seem reasonable, considering the absence of relevant contextual clues for meaning making and the lack of a shared social and cultural background between the NS and the NNSs. During on-task talk, however, the interlocutors were able to draw on an array of different contextual clues (e.g., colors, objects, in-game characters, music, maps, signs, and symbols) in the game's virtual environment to (co)(re)construct and communicate meaning (see Figure 3 and Example 8).

Figure 3

A Screenshot of WoW Gameplay during Example 8's Discussion

Example 8

Discussion Using the WoW Virtual Environment's Multimodal Contextual Cues in Figure 3

Nate:	So, this boss is gonna drop bombs umm out of the little faces around the room, and if you run up and hit the button at the bottom of the pillar, it'll stop dropping bombs. So, I think we should have somebody trying to do that. Umm, I don't think that … (*interrupted by F and MH*).	(T)
F:	Sorry?!	(I)
MM:	What?	(I)
MH:	Sorry! Can you repeat again?	(I)
Nate:	I'll repeat myself (*clearing his voice*). While we're fighting **this boss**, … **the pillars** around the room with the **little mechanical faces** on them, … they'll open up **their mouths** and drop bombs out. Umm … they'll walk up to us and explode. And I think it would be a good idea if we try to … turn them off by pushing **the little red buttons at the bottom of the pillars** for the ones for the pillars that have umm turned on. So, if you see a pillar dropping bombs, I'd appreciate it if somebody ran over and push the button to stop it.	(R)
F:	Well! I can do that.	(RR+/TAR)
MM:	No, I think the hunter is a good because he is a range and … umm he can a little move umm for pushing the button. You are really … you must run away for pushing umm the button. I think hunter is a good option for push the buttons.	(RR+/TAR)
MH:	OK! But when I should push the button?	(RR+/TAR)

In Example 8, Nate integrated two response strategies to bridge the communication gap. He slowed down his speaking rate (by embedding intentional pauses within his utterances) while drawing on the multimodal cues available in WoW's virtual environment. Using his cursor, he pointed to the non-player character (the boss), shapes and objects (the little faces and their mouths, the buttons, and the pillars), color (red), and locations (the bottom of the pillars).

The results also revealed higher rates of NfM during off-task than on-task interrupted turns in both teams. This finding can be discussed in light of (a) the communication context in which the breakdowns occurred and (b) the extent to which the interlocutors conceived NfM as crucial for successful task completion. As discussed earlier, during off-task talk, the interlocutors were involved in conversational exchanges that were, unlike on-task talk, devoid of semiotic contexts that could have helped with the (co)(re)construction of meaning. Therefore, the participants had to incur additional costs by devoting more time and effort to the process of "grounding" (Clark & Schaefer, 1987, p. 20), which refers to the speaker's and the addressee's collaborative efforts to update their shared background knowledge. These challenges, accompanied by the interlocutors' willingness to explore more about each other, prompted more negotiations during off-task interrupted turns.

The interviews and reflections revealed several occasions during on-task talk where resolving incomprehension was not considered vital (i.e., failing to grasp the precise meaning of the discourse was not deemed as having detrimental effects on task completion). As Skehan (1998) argued, tasks that are perceived as low stakes are likely to prompt less attention to form. There were also occasions where negotiations for meaning were critical for task completion, but the participants had to avoid negotiating meaning to catch up with the gameplay's fast pace. According to Skehan (1998), attention to unknown linguistic forms is less likely when there is an urgency or time pressure in achieving communication.

Another key finding concerns the sources of triggers in NS-NNS negotiations. Negotiations in T1 were

triggered more by the NS's utterances, whereas negotiations in T2 were triggered more by problematic elements in the NNSs' discourse. It can be postulated that the NNSs in T1 benefited more from obtaining comprehensible input, and the NNSs in T2 benefited more from the opportunities to modify and produce more comprehensible target language output. This finding challenges some scholars' claims that MMORPG play is more beneficial for more advanced L2 learners. For example, Rankin et al. (2006) argued that lower-level ESL students were cognitively overloaded by the multiple competencies required to navigate the game, comprehend the information displayed on the screen, and look up unfamiliar vocabulary. Our data, however, suggest that gameplay was also beneficial for the limited L2 proficiency team, as the in-game interactions provided them with more comprehensible target language input.

The results also revealed significantly higher rates of communication breakdown (83.6% in T1 and 85.7% in T2) between the NS and the NNSs (in NS-NNS and NNS-NS pairs) compared to the percentages of breakdowns (16.4% in T1 and 14.3% in T2) within NNS pairs, who shared the same L1 and had similar proficiency levels in L2. These findings support Varonis and Gass's (1985) hypothesis that individuals with the most in common, such as shared L1 and L2 proficiency, would experience fewer instances of non-understanding and, therefore, need to negotiate less. Varonis and Gass (1985) further examined three subgroups of NNS-NNS pairs, distinguishing those who shared both L1 and L2 proficiency, those who shared either L1 or L2 proficiency, and those who shared neither. They found that the pairs with the same L1 and L2 proficiency had the lowest occurrence of non-understanding routines, averaging 4.75 routines per dyad. However, the significantly higher incidence of non-understanding routines observed between NS and NNS in the current study contradicts Varonis and Gass's (1985) finding that "NNS-NNS discourse allows greater opportunity than NS-NNS or NS-NS discourse for negotiation of meaning" (p. 71). This contradiction can be attributed, in part, to differences in the communication contexts and media (i.e., avatar-embodied interactions within the WoW context vs. face-to-face conversations), which make it difficult to compare the findings. Varonis and Gass argued that recognition of shared incompetency in the target language could have driven the NNSs to acknowledge non-understanding in their interactions with other NNSs. In the current study, however, the NNSs were eagerly involved in NfM with their NS interlocutor without being overwhelmed or intimidated by the L2 proficiency gap between them and the NS. As noted repeatedly in their reflection journals and interviews (see Excerpts 3 and 4), the "affiliative bond" (Thorne, 2008, p. 321) among the participants and the establishment of a low-language-anxiety environment (Horowitz, 2019; Reinders & Wattana, 2014, 2015b) assisted the NNSs in developing the self-efficacy beliefs required to use the target language despite their limited L2 proficiency.

The additional types and patterns of Ts, Rs, and RRs emerging from our data imply that WoW's environment, with its designed game mechanics and communication dynamics (e.g., the rapid pace of communication, avatar-embodied (inter)actions, primary focus on and multimodal representation of meaning, and the multiplicity of communication channels), afford rich SLA experience that can rarely be afforded by either classroom or lab settings. We found that in $NS_{trigger} \rightarrow NNS_{signal}$ negotiation routines (where fast speaking rate, vocabulary, and vague content were the main breakdown culprits), the NNSs were attempting to decode messages by drawing on multimodal resources available in the game setting. As described in Excerpts 1 and 2, the NNSs were prompted to adopt a multimodal approach to communication, "… which is typically done through a mixture of gesture, oral performance, artistic, linguistic, digital, electronic, graphic, and artifact-related signs" (García & Wei, 2014, p. 28).

Moreover, the identification of vocabulary as the second most prominent trigger in $NS_{trigger} \rightarrow NNS_{signal}$ negotiations can partially explain why the current literature (e.g., Bytheway, 2014; Rankin et al., 2006; Rankin et al., 2009; Sylvén & Sundqvist, 2012; Zheng et al., 2015) has established the positive impact of playing MMORPGs on L2 vocabulary development. In contrast with vocabulary, the morphosyntactic elements of discourse did not impose much trouble in communications and thus remained far from the focus of negotiations. Despite the syntactic complexity of the NS's discourse and the prevalence of erroneous morphosyntactic structures in the NNSs' utterances, the interlocutors managed to decipher and interpret each other's messages correctly. This finding may account for the inadequacies of MMORPGs in developing L2 learners' syntactic knowledge (e.g., Rama et al., 2012; Rankin et al., 2009; Reinders &

Wattana, 2011).

The rates and diversity of responses are also important findings in the current research. The NS attended to 87.2% (95 out of 109) of the NNSs' signals of incomprehension in T1 and 95.0% (38 out of 40) in T2, and the NNSs reacted to 90.7% (49 out of 54) of the NS's signals of incomprehension in T1 and 100% (44 out of 44) in T2. These results can be explained by drawing on the nature of the tasks the participants were involved in during gameplay. The literature (e.g., Chen, 2018; Smith, 2003b; Ying & Maria, 2010) confirms that NfM is more likely to happen during tasks in which the exchange of information is required rather than optional. In this research, the participants were well aware that successful completion of in-game tasks demands consistent collaboration and coordination among team members. Therefore, they were meticulous in attending to signals of incomprehension, and very few signals were ignored or did not receive overt (immediate or delayed) linguistic responses. As Ensslin (2012, p. 98) emphasized, the interlocutors who opted—intentionally or unintentionally—to ignore indications of non-understanding cannot be considered "un-cooperative," as they might simultaneously be involved in other in-game events they perceived to be more urgent. Therefore, future research may delve into these particular instances of context-specific communication and explore the potential impacts of diverse gameplay contexts on NfM.

By utilizing expansion, rephrasing, and speaking rate modification, as the three most frequent response strategies, the NS managed to enhance his discourse comprehensibility through (a) providing more semantic context, (b) substituting complex syntactic and lexical elements, and (c) articulating the constituent features of the discourse more slowly and clearly. The NS's modified output served to provide the NNSs with the abundant comprehensible input (Krashen, 1985) that is crucial for successful SLA. As Scarcella and Higa (1981, p. 430) contended, this adjusted input is "optimal" and more impactful in the process of SLA as it develops from negotiation work. Similarly, the NNSs applied various types of response strategies, combined and alone, among which expansion, repetition, pronunciation modification, and rephrasing were most frequent. This finding signifies the occurrence of another learner-oriented condition (Pica, 1994) necessary for SLA: learners' production of modified output (Swain, 1985). In particular, producing more target language (through expansion strategy) and reconstructing meaning (through lexical and syntactic reformulations of the discourse) represent the NNSs' active involvement in the complex cognitive processes of meaning making, which contributes positively to SLA.

Finally, there were a few cases where participants' responses did not receive any verbal reactions. Occasionally, the responses failed to resolve the communication problems and were ignored, presumably because the initiation of a new round of negotiation was not considered crucial for task completion. Nevertheless, it would appear too simplistic to interpret all no-reaction-to-response instances as representing persistent communication failures or unsuccessful negotiations for meaning. A response might have elucidated the meaning of the discourse but was not reacted to verbally because the interlocutors preferred (or were pushed) to catch up with the gameplay (Peterson, 2012b). Alternatively, a response might have been received and reacted to appropriately but non-verbally (e.g., by performing an action in the game context, which is termed TAA in this study). The emergence of TAA as an RR strategy can be characterized by drawing on the notion of *languaging* adopted by Newgarden et al. (2015). They considered *languaging* "either as L2 players' synchronized verbal utterances and coordinated avatar actions or their coordinated avatar actions without verbalization as they completed game quests and other collaborative activities" (p. 26). Therefore, as evidenced in the current research, TAAs can be recognized as non-verbal turns that involve appropriately contextualized avatar actions.

Conclusion

Through microanalyses of negotiation episodes, the researchers were able to document the conditions that are acknowledged in the literature for assisting SLA—namely, comprehensible input, modified output, and attention to L2 form. The systematic examination of the quality and quantity of the participants' interactions revealed that playing WoW provided abundant opportunities for the NNSs to use the target language to perform a broad range of authentically contextualized, game-mediated tasks. More importantly, the results

showed that both the NS and the NNSs were attentive to the co-construction of meaning through bi- and sometimes multi-lateral negotiations, and that almost all those negotiations proved effective in resolving communication problems. The results also suggest that, regardless of their L2 proficiency levels, all NNSs benefited from the opportunities for gaining comprehensible input and producing comprehensible output through the implementation of various linguistic and non-linguistic modifications.

This study also highlighted characteristics of negotiations for meaning in the context of COTS MMORPGs. One characteristic is the *authenticity of purpose*. As reflected in interviews and reflection journals (see Figure 2), all negotiations were initiated to co-construct meaning for either performing an in-game activity or attaining an inter-cultural understanding of social, political, or cultural phenomena. Very rarely did the NNSs seek to negotiate meaning to improve their knowledge of L2 "linguistic form" (Ellis et al., 2001, p. 294). Related to the authenticity of purpose is the negotiations' *urgency upon occurrence*; that is, negotiations occurred when interlocutors perceived them as critical for successful communication of meaning. As long as the interlocutors made meaning of discourse by drawing on linguistic and/or non-linguistic cues in the game setting, they avoided negotiations for meaning. The third characteristic is the *brevity* of negotiation routines during gameplay. Negotiations were mostly brief and simple, including only a single negotiation routine. The importance of efficiency in communication during the gameplay and the availability of multimodal resources (in the game's virtual environment) for meaning-making endeavors can partially explain this simplicity. Fourth is the *multilateral nature* of some negotiation routines. On some occasions, more than two interlocutors collaborated in the co-construction of meaning, as they were well aware that the success or failure of the negotiations could affect the performance of the whole team. Finally, unlike what van der Zwaard and Bannink (2014, 2016) observed, the participants in this research could neither feign understanding of the broken discourse nor practice what Goffman (1967, p. 16) labeled as "protective maneuvers," showing respect and politeness by not challenging their interlocutors' claims of understanding. Van der Zwaard and Bannink showed that the NNSs' feigned understanding, followed by the NS's attempt to preserve the NNSs' face, impeded task completion. The gamers in this study did not aspire to dodge critical negotiations at the expense of losing the game. Further research can advance our understanding of the social, cultural, emotional, inter- and intra-personal dynamics within MMORPG game environments that drive L2 gamers to take risks initiating and actively participating in negotiations for meaning regardless of their L2 proficiency.

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Notes

1. Quests are in-game tasks a player-controlled character/avatar completes to gain a reward (e.g., in-game currency, higher levels, and experience).
2. Some sessions were screen-recorded to ascertain the trustworthiness of the participants' claims regarding their use of multimodal cues (e.g., colors, music, signs, symbols, and (re)actions) along with language to communicate and negotiate for meaning.
3. A *turn* is a stretch of talk uttered by an interlocutor at one period of time during a conversation before the floor is transferred to another interlocutor in a turn-taking system.
4. Unlike straightforward cases of NfM in which the interlocutors explicitly located the source(s) of incomprehension, it was sometimes impossible to accurately identify the discourse element(s) that triggered the negotiations. Likewise, in some cases, we could not ascertain if the participants' RRs were indicators of comprehension or strategies to avoid further rounds of negotiation.
5. To break down the significant chi-square tests and determine what contributes to the overall association

the chi-square statistics show, we examined individual standardized residuals in the crosstabulation tables. Each standardized residual is technically a z-score. As such, a standardized residual is considered significant at $p < .05$, $p < .01$, and $p < .001$ if its value lies outside of ±1.96, ±2.58, and ±3.29, respectively (Field, 2009). The positive value of a significant standardized residual indicates that the observed frequency within a cell is significantly bigger than the expected frequency, which a statistical model predicts. And the negative value of a significant standardized residual indicates that the observed frequency in a cell is significantly smaller than the expected frequency.

6. To conduct the post-hoc test, we transformed the adjusted residuals (or *z* values) for each cell to Chi-square values and calculated their corresponding *p* values. Then, we compared these *p* values against the adjusted Bonferroni corrected *p-value* for our data (i.e., 0.0083).

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Appendix A. Components of Negotiation Routines

Table A1

Components of a Negotiation Routine (Smith, 2003a; Varonis & Gass, 1985)

	Trigger	Indicator	Response	Reaction to Response
Varonis & Gass (1985)		Explicit indication of non-understanding Echo word or phrase from previous utterance Non-verbal response Summary Surprise reaction Inappropriate response Overt correction	Repetition Expansion Reduction Rephrasing Acknowledging	

	Trigger	Indicator	Response	Reaction to Response	Confirmation	Reconfirmation
Smith (2003a)	Lexical Syntactic Content- and task-related Discourse Pragmatic	Global Local Inferential Clarification request (CR) Confirmation check (CC)		Minimal response Metalinguistic talk Task-appropriate response Testing deductions	Simple confirmation Reaffirmation Comprehension check	

Table A2

Additional Types of Ts, Rs, and RR

Source	Trigger	Response	Reaction to Response
NS's Turn	Fast speaking rate Unexpected pronunciation	Repetition with a slower speaking rate Slowing down the speaking rate while implementing other types of modifications	
NNSs' Turn	Mispronunciation	Repetition with modified pronunciation	Task-appropriate (avatar-embodied) action
NS's and NNS' Turns	Distracted attention Sudden topic change		

Table A3

Frequencies of Turns, Communication Breakdowns, and Negotiations

	Total # of turns	Breakdowns		Negotiated		Complexity	
		Yes	No	Yes	No	Simple	Complex
Team 1	8432	195 (2.3%)	8237 (97.7%)	174 (89.2%)	21 (10.8%)	145 (83.3%)	29 (16.7%)
Team 2	10066	98 (1.0%)	9968 (99.0%)	96 (98.0%)	2 (2.0%)	88 (91.7%)	8 (8.3%)
N		18498		293		270	
df		1		1		1	
X^2		52.77		6.86		3.63	
p		**0.000**		**0.009**		**0.057**	
Phi Coefficient		0.053		-0.15		-0.11	

Table A4

Frequencies of Turns, Breakdowns, and Negotiations during On- and Off-task Talk

	Freq of turns/Freq of turns per hour	Frequency of breakdown/Freq of breakdowns per hour	Freq of NfM/Freq of NfM per hour	
			Yes	No
Team 1[a]				
On-task Turns	5970 (70.8%)/201.8	112 (1.9%)/3.78	94 (83.9%)/3.17	18
Off-task Turns	2462 (29.2%)/83.2	83 (3.4%)/2.8	80 (96.4%)/2.7	3
N	8432/285	195/6.59	174/5.88	21
df		1	1	
X^2		17.25	7.69	
p		**0.000**	**0.006**	
Phi Coefficient		**-0.04**	**-0.19**	
Team 2[b]				
On-task Turns	7269 (72.2%)/239.2	56 (0.8%)/1.84	54 (96.4%)/1.77	2
Off-task Turns	2797 (27.8%)/92.1	42 (1.5%)/1.38	42 (100%)/1.38	0
N	10066/331.3	98/3.22	96/3.15	2
df		1		
X^2		11.2		
p		**0.001**		
Phi Coefficient		**-0.03**		

Note. [a] Team 1 played the game for 29.58 hours, [b] Team 2 played the game for 30.38 hours

Table A5

Frequencies of Negotiated Turns across Simple and Complex Routines

		Total # of turns	Average # of turns	*SD*	Minimum # of turns	Maximum # of turns	Mode
	Team 1						
Simple routines	145 (83.3%)	571	3.9	0.54	3	6	4
Complex routines	29 (16.7%)	221	7.6	1.6	5	13	7
Total	174	792	4.5	1.6			
	Team 2						
Simple routines	88 (91.7%)	369	4.1	0.7	3	6	4
Complex routines	8 (8.3%)	64	8	1.0	7	10	7&8
Total	96	433	4.5	1.2			

Table A6

Frequencies of Communication Breakdowns in Three Dyads

	$NS_{trigger} \rightarrow NNS_{signal}$	$NNS_{trigger} \rightarrow NS_{signal}$	$NNS_{trigger} \rightarrow NNS_{signal}$	Total
Team 1	109 (55.9%)	54 (27.7%)	32 (16.4%)	195
Team 2	40 (40.8%)	44 (44.9%)	14 (14.3%)	98
N		293		
df		2		
X^2		8.87		
p		**0.012**		
Cramér's V		**0.174**		

Table A7

Frequencies of the Most Frequent Triggers

Team	$NS_{trigger} \rightarrow NNS_{signal}$				
	Fast speech rate	**Vocabulary**	**Content**	**Other**	**Total**
1	59 (54.1%)	22 (20.2%)	14 (12.8%)	14 (12.8%)	109
2	18 (45.0%)	11 (27.5%)	5 (12.5%)	6 (15.0%)	40
	$NNS_{trigger} \rightarrow NS_{signal}$				
	Mispronunciation	**Content**	**Vocabulary**	**Other**	**Total**
1	23 (42.6%)	22 (40.7%)	3 (5.6%)	6 (11.1%)	54
2	14 (31.8%)	10 (22.7%)	5 (11.4%)	15 (34.1%)	44
	$NNS_{trigger} \rightarrow NNS_{signal}$				
	Mispronunciation	**Content**	**Vocabulary**	**Other**	**Total**
1	13 (40.6%)	9 (28.1%)	5 (15.6%)	5 (15.6%)	32
2	4 (28.6%)	3 (21.4%)	5 (35.7%)	2 (14.3%)	14

Table A8

Frequencies of Two Most Frequent Indicators

Team	Explicit, global CR[a]	Explicit, local CR	Other	Total
	$NS_{trigger}$→NNS_{signal}			
1	82 (75.2%)	13 (11.9%)	14 (12.8%)	109
2	22 (55.0%)	16 (40.0%)	2 (5.0%)	40
	$NNS_{trigger}$→NS_{signal}			
1	29 (53.7%)	12 (22.2%)	13 (24.1%)	54
2	20 (45.5%)	20 (45.5%)	4 (9.1%)	44
	$NNS_{trigger}$→NNS_{signal}			
1	27 (84.4%)	4 (12.5%)	1 (3.1%)	32
2	11 (78.6%)	2 (14.3%)	1 (7.1%)	14

Note. [a] Clarification Request

Table A9

Total Frequencies of Response Strategies in $NS_{trigger}$→NNS_{signal}→$NS_{response}$

Response strategies	Team 1	Team 2
Expansion	48 (29.3%)	26 (44.8%)
Rephrasing	35 (21.3%)	9 (15.5%)
Repetition with slower speaking rates	25 (15.2%)	8 (13.8%)
Other	56 (34.1%)	15 (25.9%)
Total	164	58

Table A10

Total Frequencies of Response Strategies in $NNS_{trigger}$→NS_{signal}→$NNS_{response}$

Response strategies	Team 1	Team 2
Expansion	23 (29.9%)	23 (43.4%)
Repetition with no modification	22 (28.6%)	12 (22.6%)
Repetition with modified pronunciation	10 (13.0%)	9 (17.0%)
Rephrasing	7 (9.1%)	8 (15.1%)
Other	15 (19.5%)	1 (1.9%)
Total	77	53

Table A11

Total Frequencies of Response Strategies in $NNS1_{trigger} \rightarrow NNS2_{signal} \rightarrow NNS1_{response}$

Response strategies	Team 1	Team 2
Expansion	15 (37.5%)	8 (42.1%)
Repetition with no modification	8 (20.0%)	3 (15.8%)
Rephrasing	6 (15.0%)	3 (15.8%)
Other	11 (27.5%)	5 (26.3%)
Total	40	19

Table A12

Total Frequencies of Two Most Frequently Applied RR Strategies

Team				
	$NS_{response} \rightarrow NNS_{reaction\ to\ response}$			
	TAR	**Minimal R**	**Other**	**Total**
1	53 (48.2%)	29 (26.4%)	28 (25.2%)	110
2	22 (50.0%)	12 (27.3%)	10 (22.7%)	44
	$NNS_{response} \rightarrow NS_{reaction\ to\ response}$			
1	27 (44.3%)	7 (11.5%)	27 (44.3%)	61
2	25 (45.5%)	17 (30.9%)	13 (23.6%)	55
	$NNS_{response} \rightarrow NNS_{reaction\ to\ response}$			
1	15 (44.1%)	8 (23.5%)	11 (32.4%)	34
2	9 (47.4%)	5 (26.3%)	5 (26.3%)	19

Appendix B. Excerpts from the Participants' Reflection Journals and Interviews

Excerpt 1

MM's Reflection (June 25)

> "Most often when Nate was telling something that I couldn't understand, if it was about the game, I was not asking the first time. Mostly, I was referring to different materials [i.e., clues] in the game to discover what Nate exactly meant. When I couldn't understand [even by referring to the game contextual clues], then I would ask about it. If it [i.e., the utterance] was about something out of the game context, I was not asking the first time. I used to wait and see what others would ask or say. If others were silent and nothing happened, I would ask Nate to repeat or explain more about what he meant."

Excerpt 2

FA's Reflection (July 9)

> "The game's environment/context also helps with my learning. One of the reasons is that as Nate is talking about something in the game, I can see that thing, touch it via my avatar and observe its reaction."

Excerpt 3

MH's Interview

> "Overall, my perception is that I have made much more improvement in my understanding of the conversations. I also feel more self-confident in speaking [in English]. That is because I feel I have developed a closer friendship with Nate and other members [of the team]."

Excerpt 4

FA's Reflection (June 25)

> "In this session, I was able to communicate with Nate very well. I can speak [English] better than in the first sessions, and I feel that I have fewer pauses. I assume the same is true for MM and MH. I believe that Nate has had a significant role in this. He has helped us a lot .... The game's [positive] vibe has also been impactful. It has made conversations much more comfortable and friendly."

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