Verbal and Nonverbal Alignment in a Synchronous Chat Environment

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Introduction

Clark and Brennan (1990) suggest that alignment, or the use of similar verbal and nonverbal cues in conversation, is established through mutual knowledge and beliefs signaled by nonverbal evidence from the listener such as eye contact. Thus, when this feedback is lacking, more miscommunication should occur and thus alignment should decrease.

However, evidence shows that people interacting with computers still tend to align syntactically, linguistically, and lexically (e.g., Cleland & Pickering, 2003; Giles, Coupland, & Coupland, 1991). Even in the absence of feedback, alignment still occurs.

It is possible that such findings may be explained by the participants attempting to work with the constraints they assume the computer has. Thus, we test alignment between two people interacting via computer. We also examine whether the use of nonverbal cues such as emoticons and capitalization act as feedback and increase alignment more so than when no cues are present.

Participants and Method

42 participants debated with a confederate for 27 minutes on Instant Messenger about whether Gardasil vaccinations should be voluntary or mandatory. The confederate either disagreed or was neutral towards the participant's stance and used nonverbal cues or did not. See Figure 1.

Nonverbal Results

The participant did not align with the confederate's cue use (r = .23).

Linguistic Results

To examine lexical aspects, we used Linguistic Inquiry and Word Count (LIWC, Pennebaker et al., 2007) software. LIWC compares the words present in a text file and with an internal dictionary and returns a percentage that indicates how many of the words in the file represent a variety of categories. These percentages were correlated between the confederate and the participant. See Figure 2.

When the confederates used nonverbal cues, participants used more negative emotion words (t(40) = 2.04*) than the no-cues condition.

Semantic Results

Latent Semantic Analysis (LSA; Landauer & Dumais, 1997) allows computational comparisons of the semantic content of texts on hundreds of dimensions by comparing the texts within a semantic space.

Our semantic space is made up of the TASA corpus and 80 Wikipedia pages that add more topic-centered dimensions (e.g., "vaccination", "promiscuity," "sexually transmitted disease"). These pages were identified using the Wikipedia Miner "wikify" service, which uses word frequency and relationship information to identify words within a text that, by use of the Wikipedia algorithm, would be linked to more information about the topic.

Four analyses were conducted to find semantic alignment between...
1) confederate and participant on adjacent turns
2) the first speakers' adjacent turns
3) the second speakers' adjacent turns
4) the confederates' turns and the participants' non-adjacent future turns.

Each analysis was then compared to the same analysis of randomly shuffled turns within a transcript to find difference from chance levels. See Figure 3.

An increase of 1.3% in semantic alignment was found with each subsequent turn taken. Cue condition did not affect semantic alignment.

` = p = .06, * = p < .05, ** = p < .01, *** = p < .001

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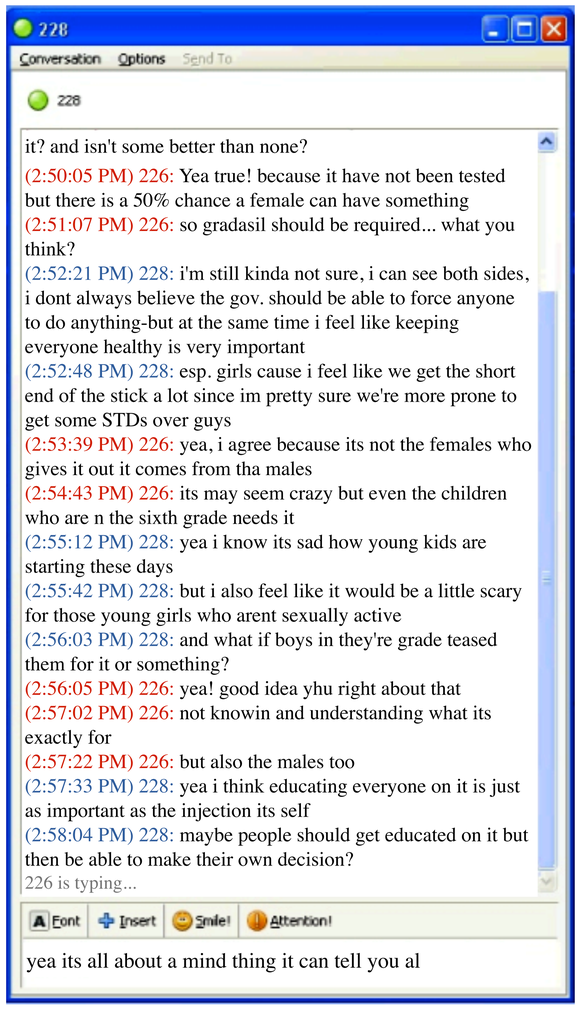


Figure 1: Example Conversation

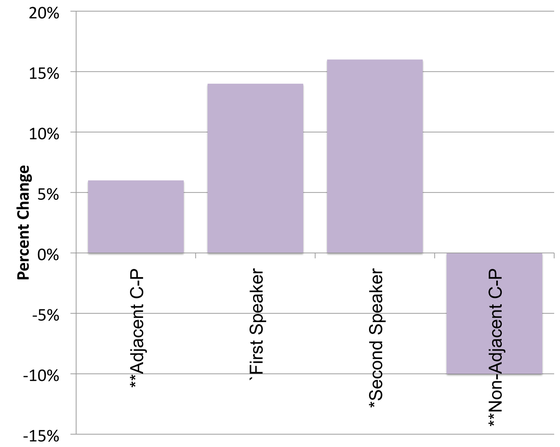


Figure 2: Percentage increase or decrease in alignment from chance

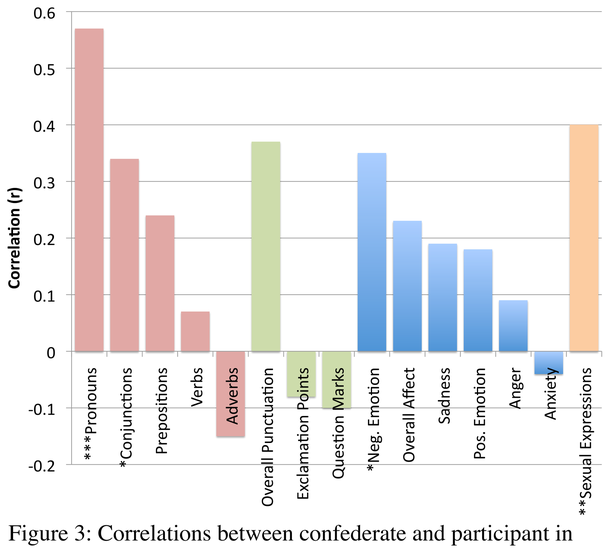


Figure 3: Correlations between confederate and participant in LIWC categories

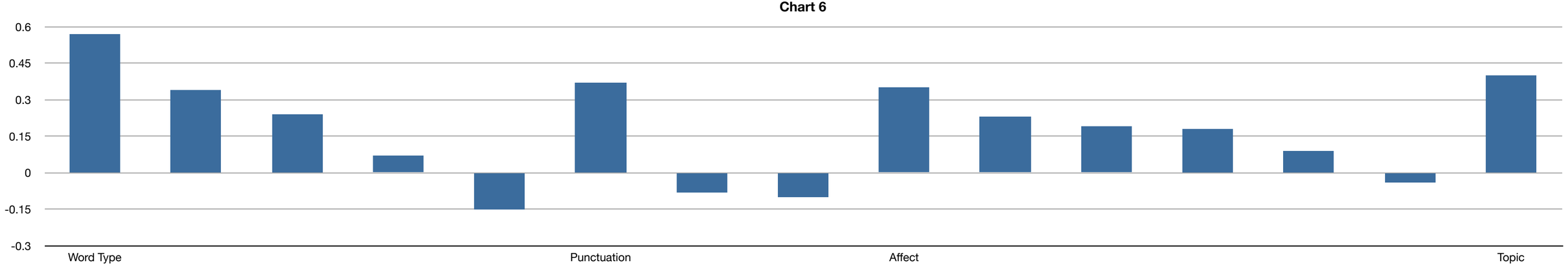
Discussion

Analyses show that in a text-only environment, interlocutors align semantically, but not nonverbally. Linguistic alignment is weak, and can be explained by task demands (e.g., the use of "I don't... but you do").

Participants did not differ semantically or in their use of cues between cue-present and cue-absent conditions, and were different in only one category linguistically. We suggest that participants did not consider the cues a method of feedback; indeed, Walther and Tidwell (1995) suggest that nonverbal cues are actually verbal in text-only environments, which is supported by the high rate of semantic alignment unaffected by cue condition.

These results suggest that human-computer interaction shows alignment primarily because communicators attempt to accomodate the constraints they believe the computer has. When two people are communicating through a computer, alignment requires adaptation in some respects (e.g., adapting nonverbal cues to verbal cues).

Word Type	Pronouns	0.57	
	Conjunctions	0.34	
	Prepositions	0.24	
	Verbs	0.07	
	Adverbs	-0.15	
Punctuation	Overall Punctua	0.37	
	Exclamation Po	-0.08	
	Question Marks	-0.1	
Affect	Neg. Emotion	0.35	
	Overall Affect	0.23	
	Sadness	0.19	
	Pos. Emotion	0.18	
	Anger	0.09	
	Anxiety	-0.04	
Topic	Sexual Expressi	0.4	



Adjacent C-P	6%			
First Speaker	14%			
Second Speaker	16%			
Non-Adjacent C-P	-10%