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10/03/2020
Depaul University PSY473

Non-verbal Communication in Virtual Reality and Marr's Ecological Level of Analysis

Non-verbal communication such as nods, and hand-movements are interesting aspects of language that occur primarily subconsciously and in conjunction with some sort of verbal communication. However, unlike in real life, these behaviors can also be entirely by choice and without the presence of verbal language in virtual reality. Individuals can, and often do choose to mute their microphones in these virtual environments for various reasons, ranging from anxiety to gender dysphoria issues. Virtual reality in that regard, offers users a unique option to disconnect themselves from these social language situations enough to feel comfortable. A person with social anxiety may choose to not speak and instead use body language as their primary communication method, giving them an artificial barrier that provides them comfort. Transgender individuals, an active group in these virtual spaces, might instead choose to leave their voice behind in order to better assimilate with their virtual avatar, or to protect themselves from prejudice. For the purpose of my interests and the topic of this paper, I'll be writing mostly about interpersonal communication, that is face-to face interactions people experience in virtual reality as opposed to communication such as pre -recorded videos or text based chatting. However, these other communication methods are often also used by vulnerable groups to protect themselves from harassment or pain in general online environments. For example, deaf individuals often find comfort in online environments because their disability ceases to be a factor, or becomes less of one" (Barak, A., & Sadovsky, Y. , 2008). I feel that these ideas can

translate successfully into virtual reality environments, giving possible explanations for why users choose to focus on non-verbal communication in VR over using their voice.

The class subject that most interested me in regards to its potential connection to my interest in non-verbal communication in VR was Marr's 3 levels and specifically the computational or ecological level for explaining decisions. The reason this level interested me was because of its focus on why people and animals do a specific behavior and why it is potentially beneficial to them. In regards to my topic of non-verbal communication in VR, I briefly gave an example in the last section, outlining how deaf individuals often feel more comfortable in online spaces as they feel that their disability becomes less of a defining factor of their being. However, another potential example comes from transgender indivudals who often use these communal VR spaces. Often, these individuals choose to portray themselves as their chosen gender through the use of an avatar of that chosen gender. For example, a person who was born male but feels as if they are a female might choose to use a female based avatar in virtual reality in order to better portray themselves as they see themselves as their ideal self. The issues arise when they don't believe that their voice fits with their vision of their ideal self. In those situations, that might be the reason that they choose to not communicate verbally, and the benefit they obtain from doing so according to a ecological theory, might be a preservation of their true self in this new environment. In fact, there have been studies on similar situation, where transgender individuals "hide" their biological sex in online spaces which in turn allows them to "feel like "real biological women" in a way that cannot be achieved in the offline world, not even by sex reassignment surgery" (Marciano, A., 2014). So there is evidence that transgender individuals obtain some sort of benefit from doing these sorts of actions even in text

based communication communities such as chatrooms. Additionally, as a greater connection towards virtual reality, the same study outlined that these situations usually involve an "adoption of a virtual identity that contributes to the users' well-being" (Marciano, A., 2014) which is something commonly done in virtual reality to a greater extent through the form of virtual avatars.

Marr's ecological level is in my opinion one of the better ways to explain these behaviors in an easy to digest way. By asking why these behaviors are done and what benefits they can potentially serve we can better understand how certain marginalized groups feel and what sort of steps can be made to assist them in feeling comfortable spaces. Using Marr's levels of analysis we can have a solid starting point to begin explaining this behavior and their potential benefits to certain groups. I went over both gender identity issues and deafness previously but there are other potential groups for which we can build an ecological theory for. For example, the most basic reason for not speaking in virtual environments might be that they are unable to speak in real life. In this instance an ecological theory for why they don't speak in VR wouldn't make much sense, as the reason is because they just can't speak. However, we can transition into proposing an ecological theory for why they choose to play the game despite not being able to speak. For that question, we can find potential answers. VR might allow these individuals to perform interpersonal interaction while giving them even more tools that they might not have in real life such as an on demand marker to write out their thoughts in physical space. Looking at these choices through Marr's ecological level we can discover multiple valid reasons as to why individuals remain non-verbal and take those findings and translate them into workable features in the software design which can either reduce the problems they encounter with verbal communication or enhance their ability to perform non-verbal communication. Additionally, we

can potentially find community issues that need to be solved outside of software solutions. For example, if an individual remains non-verbal as a precaution against harassment by certain groups developers can then work on fixing these community issues in the future. There are countless reasons for why someone might choose to remain non-speaking in virtual reality, and by making an ecological theory we can start to discover what those reasons are, what benefits they gain from their choices, and then go deeper into how these choices were made and why.

Remaining non-verbal and communicating instead with body language, sign language, or through other means remains a popular choice in certain virtual environments. In virtual reality, unlike other online areas, the user has tools at their disposal to be more efficient with non-verbal communication allowing those who make this choice to still participate without losing out on too much productivity compared to their peers. Studies done in the past have found various reasons as to why certain groups remain non-verbal in online space, these can range from feeling more like their self identified gender, to remaining non-verbal in order to prevent harassment. From an ecological theory standpoint, these are the reasons they remain non-verbal and the benefits they gain from their action is as well outlined in those same reasons. However, because of the unique disconnect that virtual reality affords users, ecological theories made for these interpersonal communications might be untransferable to the real world despite feeling as if they should be. Despite this caveat, Marr's levels of analysis can be a helpful way to look at this choice, and by creating ecological theories based on his first level, developers and everyday users can better understand subsections of the virtual reality community and their real struggles and the ways to potentially remedy their real issues.

References

Barak, A., & Sadovsky, Y. (2008). Internet use and personal empowerment of hearing-impaired adolescents. Computers in Human Behavior, 24(5), 1802–1815. https://doi-org.ezproxy.depaul.edu/10.1016/j.chb.2008.02.007

Abstract

The Internet has become an ordinary and widely accepted alternative social environment--known as cyberspace--in which many people take part in numerous activities. For the hearing-impaired, cyberspace provides extra benefits for two basic reasons: means of communication, which is primarily based on visual (text and images) and not auditory channels, and the convenient possibility of concealing their handicap from other users, thus gaining more security and a sense of equality. The purpose of the current study was to examine characteristics, intensity, and types of use of the Internet by hearing-impaired adolescents compared to an equivalent group of normal-hearing participants, with gender and adolescence stage (age 12-15, or 16-19) as additional independent variables. In addition, the intensity of using the Internet as a possible moderator of deaf participants' well-being was examined by comparing measures of loneliness and self-esteem between low- and high-intensive hearing-impaired users on the one hand, and hearing participants, on the other. Questionnaires were administered to 114 hearing-impaired and 100 hearing participants, matched for intelligence and socio-economic status. Main results showed that for both genders and for the two adolescence stages, hearing-impaired participants were motivated to use, and actually did use, the Internet more intensively than their hearing counterparts. Furthermore, the hearing-impaired used the Internet more than did hearing participants for both personal and group communication. Hearing and intensively Internet-using deaf participants were similar in level of well-being, both higher than the well-being of less-intensively Internet-using deaf participants. The Internet may thus be viewed as an empowering agent for the hearing-impaired. (PsycINFO Database Record (c) 2016 APA, all rights reserved)

Abstract:

This paper examines the ways transgender users manoeuver between online and offline worlds in order to negotiate their complicated gender identity and to overcome offline impediments. The study is based on virtual ethnography and discourse analysis within two online arenas, a newsgroup and a website, which are central to the Israeli transgender community. The analysis suggests that transgender users employ cyberspace as preliminary, complementary, and/or alternative spheres. Delving deeper into the meaning of the alternative sphere, the paper revisits 2 central issues in Internet research, namely the relationships between the online and the offline worlds, and identity management within online settings. The paper concludes by proposing a new term – VirtuReal – to address these issues.