SYNCHRONOUS ONLINE DISCUSSIONS
Participation in a Group Audio Conferencing and Textual Chat as Affected by Communicator's Personality Characteristics and Discussion Topics

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Abstract: The development of instructional technology increases the use of synchronous e-learning procedures which enable real-time interactions. The study explores whether the willingness to participate as well as actual participation in synchronous group discussions is affected by participant personality (extroversion-introversion), medium characteristics and discussion topic sensitivity. The research is composed of two sequenced sub-studies. The first one investigates the *willingness to participate* while the second study explores the degree of *actual participation* in discussions. An online self-report questionnaire was completed by 405 adult Internet users. Following that, 120 volunteers extracted from this sample were randomly assigned to face-to-face, audio conferencing, or textual chat gender-mixed experimental conditions and conducted two short discussions (having low and high degrees of topic sensitivity). The relation between estimated and actual participation was explored, as well as the equalization effect of online interactions. The first study findings show that, in general, participants prefer conventional over sensitive discussion topic; they also prefer face-to-face discussion rather than online communication. As hypothesized, participant personality affects the willingness to partake in discussions: extroverts prefer taking part via a more revealing communication medium; introverts express greater readiness for discussion via textual chat. The results of the study expand the understanding of student behaviour in synchronous e-learning.

1   INTRODUCTION

The quick development of Internet technologies increases the use of synchronous communication which enables real-time interpersonal interactions in cyberspace. Participation in online group discussions is affected, among other factors, by medium characteristics, discussion topics, and participant personality. The present study investigates the level of participation in face-to-face communication versus synchronous interaction through audio conferencing and textual chat. Specifically, the study explores whether the willingness to participate, as well as actual participation in group discussions, is affected by participant personality (i.e., extroversion-introversion), medium characteristics, and the sensitivity of discussion topic. At this point in time, the research of the willingness to participate in group discussions (the first study of two-study series) is finished, and the exploration of actual participation (the second study) is work-in-progress. The results expand the understanding of behaviour in synchronous e-learning, and group e-communication within social and organizational contexts.

2   RELATED STUDIES

There are several theories that differentiate media by their inherent features in order to predict efficient communication. One of the leading theoretical approaches is the Media Richness Theory (Daft &

Lengel, 1984). According to this theory, face-to-face communication is considered the most efficient way to convey complex messages. Empirical research regarding the influence of media richness on communication provides mixed results: some studies found evidence supporting it (for recent review see Donabedian, 2006), while other findings pointed to the fact that a rich medium provides distracters that may negatively affect communication (Blau & Caspi, 2008; Caspi & Levin, 2008; Setlock, Quinones & Fussell, 2007). Some researchers even claimed that a "lean" communication medium (such as e-mail or textual chat) may provide rich interpersonal communication. Walther's (1996; 2007) findings on the "hyperpersonal effect" of e-communication showed that text-based interaction can possibly equal or even exceed relational effects derived from comparable face-to-face interactions. This approach received extensive theoretical and empirical support in studying online communication (e.g., Joinson, 2003; 2007; Suler, 2004) and e-learning (e.g., O'Sullivan, Hunt, & Lippert, 2004). The claim that online video, audio, or textual chat may be as efficient as face-to-face communication (Walther, Loh & Granka, 2005) has been studied mostly in a textual environment. The increasing use of online audio and video conferencing (Ng, 2007; Wang, 2006) requires studying the impact of these media' characteristics on online behaviour. Voice provides meta-communication features of human messages through loudness, intonation, pitch, and breaks (Pickett, 1998). Thus, audio conferencing may have a different effect on interpersonal interaction than chat (Barak, 2007), and result in different group behaviour (Blau & Caspi, 2007).

Studies comparing synchronous online and face-to-face communication showed controversial results: while some of them found decreased participation in audio conferencing and textual chat (Berge & Fjuk, 2006), others claimed that textual chat (Hudson & Bruckman, 2002; Lobel et al., 2002) and audio conferencing (Blau & Caspi, 2008) increase participation compared to offline interaction.

Personality characteristics of users may impact interpersonal and group online behaviour; the trait of extroversion-introversion is considered of particular relevance to Internet use (Amichai-Hamburger, 2005; 2007). An extrovert is a friendly person who seeks company, desires excitement, takes risks, and acts on impulse, whereas an introvert is a quiet, reflective person who prefers his or her own company, does not enjoy large social events, and does not crave excitement (Eysenck & Eysenck, 1975). Discussing the role of the Internet as a

compensatory psychological tool, Kraut et al. (2002) claimed that people who easily befriend offline would also have more online friends ("the rich get richer" phenomenon). Other researchers hold that the protected Internet environment may assist introverts in expressing themselves more freely in an online than in an offline relationship ("poor to get rich"; Amichai-Hamburger, 2007; Maldonado, et al., 2001; McKenna, Green & Gleason, 2002). It has been noted that while extroverts feel comfortable both offline and online, introverts express themselves significantly more freely on the net (McKenna, Seidman, Buffardi & Green, 2007). Interacting online, introverts adopt offline behaviour patterns of extroverts (Amichai-Hamburger, Wainapel & Fox, 2002; Maldonado et al., 2001; McKenna & Seidman, 2005), among others active participation in discussions (McKenna et al., 2007).

It should be taken into consideration that the relation between personality characteristics and online behaviour may be mediated by participant demographics (Hamburger & Ben-Artzi, 2000; Maldonado et al., 2001), type and amount of Internet use (Anolli, Villani & Riva, 2005; Peris et al., 2002), and discussion topic sensitivity (Hertel, Schroer, Batinic & Naumann, 2008).

3 METHOD

The present study aims to explore some psychological aspects of synchronous group communication using the Internet. Group behaviour in face-to-face communication versus online interactions through audio conferencing and textual chat are compared. Specifically, the study investigates whether medium characteristics, participant personality (i.e., extroversion – introversion), and discussion topic sensitivity affect the willingness to participate and the actual degree of participation using the different media. The research is composed of two sequenced sub-studies.

3.1 Study 1

The first study investigates the *willingness to participate* in discussion as related to medium characteristics, participant personality, and discussion topic sensitivity. The hypotheses were that extroversion-introversion would correlate with willingness to participate in face-to-face communication mode compared to audio conferencing or textual chat discussion (because of the differences in the degree of perceived

anonymity) and that the sensitivity of discussion topic would augment this tendency.

3.1.1 Participants

An online viral sampling of 405 Israeli adult Internet users, 118 of them men (29.1%), was composed. Figure 1 shows the distribution of participants' age (Range: 18-76, Median: 29, Mean: 31.89, SD: 10.97, Skewness: 1.08).
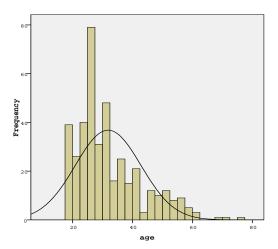

Figure 1: Participant age distribution.

Table 1 shows the percentage of the participants' Internet usage in general and online synchronous communication tools in particular.

Table 1: Percentage of the Internet and communication applications usage.

Usage level	Internet-general	Personal chat	Chat room	Audio
Each day	85.7	24.4	0.2	0.7
2-3 times at week	10.6	14.6	0.7	6.2
Ones at week-ones at month	3.7	13.8	3.2	9.4
Less then ones at month	0	15.1	6.9	18
Not using	0	31.9	87.2	62.7

3.1.2 Instruments and Procedure

The participants completed an online self-report questionnaire sent by email. To measure the trait of extraversion-introversion we used a scale composed of 12 items from Hebrew short version of the NEO-PI-R questionnaire based on the Big Five model (Costa & McCrae, 1992). Scale internal consistency was high (α=.80). The score of extroversion-introversion (Range: 21-69, Medium: 51, Mean:

51.26, SD: 8.08) was computed by summing up participant answers to the items (scale 1-6). For the statistical analysis the participants were divided into two groups (extroverts and introverts) using the median scale score (the participants who received the median score were defined as introverts).

In addition, the participants were asked to imagine group discussions and report (on a scale of 1-8) about their willingness to discuss conventional and sensitive topics using different communication media: face-to-face, audio conferencing and textual chat (following Hertel et al., 2008).

3.2 Study 2

The second study explores the degree of *actual participation* in a group discussion as influenced by medium characteristics, participant personality, and discussion topic sensitivity. In addition, the second study investigates the relationship between estimated and actual participation, as well as the equalization effect of online communication (i.e., more equal online participation compared to offline one, because of the diminished status differences between communicators). The hypotheses were that extroversion-introversion would correlate with actual participation in face-to-face versus audio conferencing or textual chat discussions, and that the sensitivity of discussion topic would augment this tendency. In addition, it was hypothesized that the willingness to participate positively correlates with actual participation, and participant personality characteristics moderate this correlation. Concerning the equalization effect, it was hypothesized that online participation would be more equal compared to offline one, and the participation using textual chat would be more equal in comparison to participation through audio conferencing.

The participants of the second study consisted of 120 volunteers derived from Study 1. The participants were randomly assigned to three (i.e., face-to-face, audio conferencing and textual chat) gender-mixed experimental conditions and two short non moderated discussions (i.e., having low and high degree of topic sensitivity) were conducted. The discussions were recorded and the willingness to participate was compared to actual behaviour in each communication mode.

4 STUDY 1 RESULTS AND DISCUSSION

4.1 Effects of Media and Discussion Topics

Table 2 shows the means (1 = "not at all", 8 = "very much") and SDs of the participants' willingness to discuss the conventional and sensitive topics through audio conference, chat, and face-to-face.

Table 2: Means and SDs of the willingness to discuss different topics through communication media.

Medium Topic Sensitivity		F2F	Audio	Chat	Average
Conventional	M	6.60	3.15	3.23	4.33
	SD	1.57	1.90	1.95	1.06
Sensitive	M	6.06	2.66	3.06	3.93
	SD	1.98	1.77	2.26	1.03
Average	M	6.33	2.90	3.14	4.13
	SD	1.43	1.63	1.80	0.91

A 2x3 repeated measures ANOVA showed main effects for communication medium, the sensitivity of the discussion topic, and their interaction (see Table 3).

Table 3: Effects of medium and discussion topic sensitivity on the willingness to participate: Repeated measures ANOVA.

Effect	F	df	p
Medium	483.1	2, 403	<.001
Topic	62.02	1, 404	<.001
Interaction	3.45	2, 403	<.05

Generally, participants preferred the conventional (M=4.33) over the sensitive discussion topic (M=3.93, $p<.001$); they also preferred face-to-face discussion (M=6.33) rather than audio conferencing (M=2.90) and chat communication (M=3.14, $p<.001$). For online interactions, participants preferred using chat rather than audio conferencing ($p<.05$). Discussing a conventional topic, there were no statistically significant differences between audio (M=3.15) and textual communication (M=3.23), but offline interaction (M=6.60) was preferable than both online communication modes ($p<.001$). Discussing a sensitive topic, the participants also preferred offline (M=6.06) than online communication, but chat (M=3.06) was preferable than the interaction through audio conferencing (M=2.66, $p<.001$). Is seems that participants felt more comfortable discussing the sensitive topic via a "lean" communication medium. The use of personal textual chat mediated the media effect on the willingness to participate in discussions; using audio conferencing mediated the effects of medium, discussion topic and their interaction. Thus, participants' media preferences seem to be affected by their past experiences in using audio conferencing and chat communication.

4.2 Effects of Extroversion -Introversion Trait

Table 4 shows the means and SDs of extroverts' and introverts' willingness to discuss different topics using different communication media. As hypothesized, participant personality affected the willingness to partake in discussions (see Table 5).

In general, extroverts (M=4.29) were more inclined to participate in discussions than introverts (M=3.98). Participant personality interacted with type of medium. There was no statistically significant difference in willingness of extroverts (3.11) and introverts (3.18) to discuss through textual chat. However, using audio conferencing ($p<.01$) and face-to-face ($p<.001$) extroverts (audio conferencing M=3.12, face-to-face M=6.63) were more inclined to partake compared to introverts (audio conferencing M=2.70, face-to-face M=6.05).

Table 4: Means and SDs of the willingness to discuss by extroversion-introversion, type of medium, and topic sensitivity.

Medium Topic Sensitivity		Extroverts				Introverts			
		F2F	Audio	Chat	Average	F2F	Audio	Chat	Average
Conventional	M	6.88	3.41	3.21	4.50	6.34	2.91	3.25	4.17
	SD	1.36	1.90	1.87	1.05	1.70	1.87	2.03	1.06
Sensitive	M	6.39	2.83	3.01	4.08	5.75	2.50	3.11	3.79
	SD	1.86	1.77	2.21	0.96	2.04	1.75	2.30	1.06
Average	M	6.33	3.12	3.11	4.29	6.05	2.70	3.18	3.98
	SD	1.43	1.60	1.72	0.86	1.54	1.63	1.87	0.94

Through online discussions, extroverts did not show preferences for a particular communication medium, while introverts preferred chat (M=3.18) than audio conferencing interactions (M=2.70, $p<.01$).

Thus, introverts expressed greater readiness for discussions via medium low in transmitting social communication cues than did extroverts. The use of personal textual chat mediated the extroversion-introversion trait effect on willingness to participate in discussions.

Table 5: Effects of extroversion-introversion, medium, and discussion topic sensitivity on the willingness to participate: Repeated measures ANOVA.

Effect	F	df	p
Extroversion	12.14	1, 404	<.001
Type of medium	484.26	2, 403	<.001
Topic sensitivity	62.01	1, 404	<.001
Medium x Extroversion	3.81	2, 403	<.05
Topic x Extroversion	.14	1, 404	n.s.
Medium x Topic	3.46	2, 403	<.05
Medium x Topic x Extroversion	.54	2, 403	n.s.

5 THE STUDY CONTRIBUTIONS

The current study contributes to cyberspace and media communication research. On the *theoretical* level, the study explores the effect of communication media as well as psychological factors on online behaviour. The impact of personality characteristics and their interaction with media features are analyzed. Online interaction is investigated through communication media having different degrees of anonymity (visual anonymity vs. both visual and auditory anonymity).

Methodologically, the study combines quantitative (measurement by a questionnaire) and qualitative (a content analysis) research methods. Such a mixed design allows the exploration of both universal and unique aspects of human online behaviour. A methodological weakness of previous studies was overcome through random assignment of participants into different experimental conditions. However, the study did not rely on a laboratory experiment; conducting the research in a natural habitat of actual Internet environment improves the ecological validity of the study and enlarges the generalization of its findings (Riva, Teruzzi & Anolli, 2003). In addition, the study

crosschecked the willingness to communicate through different media with actual online behaviour, and explored whether participant personality characteristics moderate the relationship between the declared and actual participation.

The present study proposes some *implications* concerning the use of synchronous online communication, and especially audio conferencing which – despite its growing use in social, learning, and organizational context – has rarely been studied. In addition, the study explores both social and performance aspects of communication – a combination especially relevant to e-learning and group e-communication in organizations. The results of the study broaden the understanding of human behaviour in synchronous online communication.

REFERENCES

Amichai-Hamburger, Y. (2005). Personality and the Internet. In Y. Amichai-Hamburger (Ed.), *The social net: Human behaviour in cyberspace* (pp. 27-55). New York: Oxford University Press.

Amichai-Hamburger, Y. (2007). Personality, individual differences and Internet use. In A. Joinson, K. Y. A. McKenna, T. Postmes, & U. D. Reips (Eds.), *Oxford handbook of Internet psychology* (pp. 187-204). Oxford, UK: Oxford University Press.

Amichai-Hamburger, Y., & Ben-Artzi, E. (2000). The relationship between extraversion, neuroticism, and the internet. *Computer and Human Behaviour, 16,* 441-449.

Amichai-Hamburger, Y., Wainapel, G., & Fox, S. (2002). "On the Internet no one knows I'm an introvert": Extroversion, neuroticism, and Internet interaction. *CyberPsychology & Behaviour, 5,* 125-128.

Anolli, L., Villani, D., & Riva, G. (2005). Personality of people using chat: An on-line research. *CyberPsychology & Behaviour, 8,* 89-95.

Barak, A. (2007). Phantom emotions: Psychological determinants of emotional experiences on the Internet. In A. Joinson, K. Y. A. McKenna, T. Postmes, & U. D. Reips (Eds.), *Oxford handbook of Internet psychology* (pp. 303-329). Oxford, UK: Oxford University Press.

Blau, I., & Caspi, A. (2007). Participation in and efficiency of distance learning using Skype™. In M. Ronen (Ed). *Online Academic Learning* (pp.75-77). Holon: Holon Institute of Technology. [in Hebrew]

Blau, I., & Caspi, A. (2008). Do media richness and visual anonymity influence learning? A comparative study using Skype™. In Y. Eshet, A. Caspi, & N. Geri (Eds.) *Learning in the Technological Era* (pp. 18-25). Ra'anana, Israel: The Open University of Israel.

Berge, O., & Fjuk, A. (2006). Understanding the multiple roles of online meetings in a net-based course. *Journal of Computer Assisted Learning, 22,* 13-23.

Caspi, A., & Levin, T. (2008). Students' media choice: Media richness, social influence, or experience? In Y. Eshet, A. Caspi, & N. Geri (Eds.) *Learning in the Technological Era* (pp.94-10). Ra'anana, Israel: The Open University of Israel. [in Hebrew]

Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO personality inventory (NEO PI-R) and NEO five-factor inventory (NEO FFI) professional manual.* Odessa, FL: Psychological Assessment Resources.

Daft, R. L., & Lengel. R. H. (1984). Information richness: A new approach to managerial behaviour and organization design. In B. M. Staw, & L. L. Cummings (Eds.), *Research in organizational behaviour* (Vol. 6, pp. 191-233). Greenwich, CT: JAI Press Inc.

Donabedian, B. (2006). Optimization and its alternative in media choice: A model of reliance on social-influence processes. *Information Society, 22,* 121-135.

Eysenck, H. J., & Eysenck, S. E. G. (1975). *Manual: Eysenck Personality Inventory*. San Diego, CA: Educational and Industrial Testing Service.

Hertel, G., Schroer, J., Batinic, B., & Naumann, S. (2008). *Do shy people prefer to send e-mail? Personality effects on communication media preferences in threatening and non- threatening situations.* Unpublished manuscript**.** Retrieved October 18, 2008, from: http://www.abo.psychologie.uni-wuerzburg.de/virtualcollaboration/publications.php?action=view&id=22

Hudson, J. M., & Bruckman, A. (2002). IRC Français: The creation of an internet-based SLA community. *Computer Assisted Language Learning, 15,* 109-134.

Joinson, A. N. (2003). *Understanding the psychology of Internet behaviour.* Basingstoke, UK: Palgrave Macmillan.

Joinson, A. N. (2007). Disinhibition and the Internet. In J. Gackenbach (Ed.), *Psychology and the Internet: Intrapersonal, interpersonal and transpersonal implications* (2nd ed.) (pp. 76-92). San Diego, CA: Elsevier Academic Press.

Maldonado, G. J., Mora, M., Garcia, S., & Edipo, P. (2001). Personality, sex and computer communication mediated through the Internet. *Anuario de Psicologia 32,* 51-62.

McKenna, K.Y.A., Green, A.S., & Gleason, M.J. (2002). Relationship formation on the Internet: What's the big attraction? *Journal of Social Issues, 58,* 9–32.

McKenna, K. Y. A., & Seidman, G. (2005). You, me, and we: Interpersonal processes in online groups. In Y. A. Hamburger (Ed.), *The social net: The social psychology of the Internet* (pp. 191–217). New York: Oxford University Press.

McKenna, K. Y. A., Seidman, G., Buffardi, A., & Green, A. S. (2007). *Ameliorating social anxiety through online interaction.* Manuscript under review. Ben-Gurion University.

Kraut, R., Kiesler, S., Boneva, B., Cummings, J.N., Helgeson,V., & Crawford, A.M. (2002). Internet paradox revisited. *Journal of Social Issues*, *58,* 49–74.

Ng, K. C. (2007). Replacing face-to-face tutorials by synchronous online technologies: Challenges and pedagogical implications. *The International Review of Research in Open and Distance Learning 8,* 1-15.

O'Sullivan, P. B., Hunt, S. K., & Lippert, L. R. (2004). Mediated immediacy: A language of affiliation in a technological age. *Journal of Language and Social Psychology, 23,* 464-490.

Peris, R., Gimeno, M. A., Pinazo, D., Ortet, G., Carrero, V., Sanchiz, M., & Ibáñez, I. (2002). On-line chat rooms: Virtual spaces of interaction for socially oriented people. *CyberPsychology & Behaviour, 5,* 43–51.

Pickett, J. M. (1998). *The acoustics of speech communication: Fundamentals, speech perception theory and technology*, (2nd ed.) Boston, MA: Pearson/Allyn and Bacon.

Riva, G., Teruzzi, T., & Anolli, L. (2003). The use of the Internet in psychological research: comparison of online and offline questionnaires. *CyberPsychology & Behaviour, 6,* 73–80.

Setlock, L. D., Quinones, P., & Fussell, S. R. (2007, January). *Does culture interact with Media Richness? The effects of audio vs. video conferencing on Chinese and American dyads.* Proceedings of the 40th Annual Hawaii international Conference on System Sciences, p.13. HICSS, IEEE Computer Society, Washington, DC.

Suler, J. (2004). The online disinhibition effect. *CyberPsychology & Behaviour, 7,* 321–326.

Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research*, *23,* 3-43.

Walther, J. B. (2007). Selective self-presentation in computer-mediated communication: Hyperpersonal dimensions of technology, language, and cognition. *Computers in Human Behaviour, 23,* 2538-2557.

Walther, J. B., Loh, T., & Granka, L. (2005). Let me count the ways: The interchange of verbal and nonverbal cues in computer-mediated and face-to-face affinity. *Journal of Language and Social Psychology, 24,* 36-65.

Wang, Y. (2006). Negotiation of meaning in desktop videocongerencing-supported distance language learning. *ReCALL, 18,* 122-146.