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Internet use and personal empowerment of hearing-impaired adolescents

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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.
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1. Introduction

The Internet has become an accepted and common means of engagement in a variety of activities, many of which substitute for parallel activities in the physical, face-to-face world. For many people, the Internet has provided an alternative way—usually more convenient and preferable—of performing and taking part in various activities more efficiently and perhaps more enjoyably (Bargh & McKenna, 2004; Haythornthwaite & Hagar, 2004). Cyberspace—the term given to the virtual alternative social environment created by the Internet—has become a major place for people to meet, talk and discuss, learn, shop, play, and even make love. Obviously, all this has meaning much beyond the mere use of technology and aspects related to practicality, as people in cyberspace go through various psychological experiences (Barak & Suler, 2008) just as they do, or would have done, in their physical, "real" environment; they may perhaps experience even more profound emotions there than in the real world (Barak, 2007). Thus, the Internet and people's experiences with it should be regarded as an important resource and as a means of understanding of people's lives, on the one hand, and inducing and initiating changes in them, on the other.

Because of its special communication-related characteristics, the Internet has created a special opportunity for people with disabilities. Especially associated with invisibility, online communication is also characterized by textuality, availability, and multimodality. These features enable disabled people—in various areas of disability—to take advantage of the medium without being identified as handicapped, thus avoiding stigmatic perceptions, attitudes, and behaviors. This unique experience, enabled only in cyberspace, has created new psychological experiences and opportunities for exceptional people. Through online communication, persons challenged by height, weight, baldness, loss of an arm or a leg, or another somatic defect or exceptionality, as well as people who face voice-communication difficulties—such as stuttering and muteness—quickly feel similar to what normal people feel. That is, their disability ceases to be a factor, or becomes less of one, in their social experiencing. They, therefore, may undergo a process of personal empowerment in gaining confidence and assurance and in lowering depression, anxiety, and feelings of loneliness—in other words, they may enhance their general well-being (Bowker & Tuffin, 2002, 2004, 2007; Houlihan et al., 2003; Seymour & Lupton, 2004; Vesmarovich, Hauber, & Jones, 2000). Indeed, Thoreau (2006) recently showed that disabled people online—when they share virtual neighborhood with others like them—express specific and special needs and act quite differently from the way they do in regular online environments.

The hearing-impaired go through similar experiences. The Internet has provided them a special opportunity to communicate with others—both those who are similarly disabled, as well as people with normal hearing—in the ordinary way typical of most Internet contacts: through reading and writing. This puts the hearing-impaired in a special situation, one they usually do not experience in their ordinary social contacts: the ability to freely communicate with people—be it via email, forum, instant messaging (IM), chat, or blogs—without revealing their special health status. This fact not only projects upon their enhanced communication ability, but also relieves them of regular psychological uneasiness and stress from fearing and being defensive about stereotypic responses toward them. Indeed, deaf people report enhanced use of the Internet as surveys in Australia (Deaf Australia Online II, 2001; Power, Power, & Horstmanshof, 2007), the United Kingdom (Pilling & Barrett, 2008), and the United States (Bowe, 2002; Henderson, Grinter, & Starner, 2005; National Association of the Deaf, 2000) have revealed.

The advantage of exploiting the Internet for various uses with the hearing-impaired has been implemented in several ways and areas. These include applications in teaching, learning, and education (Belcastro, 2004; Kluwin & Noretsky, 2005), psychotherapy (Balachandra, 2004), participation in online support groups (Cummings, Sproull, & Kiesler, 2002), and sign language-based online communication (Fels, Richards, Hardman, & Lee, 2006). The Internet allows another advantage for deaf people (and those with several other disabilities) that has to do with psychological treatment. Internet-delivered therapy—either offered by Web-based, self-help methods, or by online textual communication procedures—may be of much help to these special populations. Treatment of panic disorder (Carlbring et al., 2005), or social phobia (Carlbring, Furmark, Steczkó, Ekselius, & Andersson, 2006) by Web-based therapy, or generally by online textual communication methods (Suler, 2008), for example, free deaf people from use of speech. Moreover, even a therapist who uses sign language is not necessary.

Nevertheless, deaf people might encounter special difficulties in using the Internet as recently shown by Smith (2006/7), and particular training may perhaps be needed for this unusual population. Also, as Internet technology is constantly changing, as speed of communication has significantly been growing, bandwidth has been improving, and application software has much been upgraded, use of voice and video channels have become more common (Horrigan & Smith, 2007). This development might interfere and somewhat undermine the ability of deaf people to use the Internet in an egalitarian way and feel equal.

Cyberspace has been an extremely attractive social area for adolescents, who have exploited it to a large degree. Teenagers search intensively for online information for learning and personal purposes, form interpersonal relationships through IM software, forums, and chat rooms, publish personal stories in blogs and social networks, and frequently respond to those of others, play in solitary and group online games, and participate widely in other online activities (Fox & Madden, 2005; Greenfield & Yan, 2006). For the younger generation, "born into" the digital, virtual, technological world, this environment offers a natural habitat that is often preferred to face-to-face contacts. It seems that several characteristics of the Internet—such as anonymity, invisibility (and lack of eye-contact), elasticity of communication (choice of asynchronous or synchronous contacts), textuality, availability, optional multitasking, affordability, aloneness, optional multi-channel communication, and playfulness—make this special communication means a unique experience in meeting youngsters' personal desires (Paul & Bryant, 2005; Valkenburg & Peter, 2007a; Valkenburg, Schouten, & Peter, 2005). Using the Internet and experiencing cyberspace in any number of ways—so long as certain security precautions and netiquette behavior are followed (Borzekowski, 2006)—not only serves practical purposes but also contributes to users' sense of well-being and to their satisfaction of psychological needs. Beyond mere functionality, this aspect might explain why cyberspace has become central in adolescents' lives and influences their behaviors and experiences offline, as well (Donchi & Moore, 2004; Gross, Juvonen, & Gable, 2002; Maczewski, 2002; Valkenburg & Peter, 2007b, 2007c; Valkenburg, Peter, & Schouten, 2006). Age group and gender have been found to interact with Internet usage and various online behaviors, though it seems that these differences are small and gradually vanishing (e.g., Calvert, Mahler, Zehnder, Jenkins, & Lee, 2003; Colley & Comber, 2003; Grimes, Hough, & Signorella, 2007; Imhof, Vollmeyer, & Beierlein, 2007; Thayer & Ray, 2006; Tsai & Lin, 2004).

The purpose of the present study was to investigate several questions concerning hearing-impaired adolescents' use of the Internet. First, we wanted to examine motivational characteristics for Internet use and whether specific activities within the medium exist for this population in comparison with equivalent hearing adolescents. We hypothesized that because of the special characteristics of online communication, the hearing-impaired would be more motivated to use the Internet—especially for interpersonal contacts—than hearing adolescents. Second, we wanted to compare the two groups' actual uses of the Internet, hypothesizing that deaf adolescents use certain online tools, and the Internet in general, more intensively than do hearing adolescents. Third, we sought to test issues related to these users' well-being. Although generally hearing adolescents' well-being might be greater than that of hearing-impaired adolescents, we hypothesized that deaf adolescents who use the Internet extensively would possess a level of well-being similar to that of hearing users, compared to deaf adolescents who do not use the Internet or use it less. In this sense, we assumed that the use of functional technology could be a significant factor in enhancing personal empowerment (D'Alessandro & Dosa, 2001). As previous research shows, the hearing-impaired typically feel more lonely (Knutson & Lansing, 1990; Murphy & Newlon, 1987) and value themselves lower (de Graaf & Bijl, 2002; Yee, Watkins, & Crawford, 1997) than do hearing people. Thus, we hypothesized that the process of empowerment induced by using the Internet would reflect in a decreased sense of loneliness and in elevated self-esteem. These hypotheses were tested in relation to adolescence stage (early versus late) and gender.

2. Methods

2.1. Participants

Participants in our study included 100 hearing-impaired and 114 hearing adolescents living in Israel who were sampled in schools (including special schools for the hearing-impaired) throughout the country. Whole classes, randomly selected from different schools, were used to recruit the participants. Of the hearing-impaired, there were 51 boys, 28 of whom were in early (age 12–15) and 23 in late (age 16–19) adolescence, and 49 girls (24 and 25, respectively). Of the hearing participants, there were 56 boys (34 and 22, respectively) and 58 girls (34 and 24, respectively). The hearing and hearing-impaired participants were matched according to socio-economic status and intelligence as reported by school administrations. All participants (haring and hearing-impaired) were children of hearing parents and spoke Hebrew as their mother tongue. All deaf participants had a hearing deficit from birth.

2.2. Instruments

2.2.1. General Internet use questionnaire

This questionnaire included four items, pertaining to the duration of Internet use (7-point scale, from "never" to "five or more years"), frequency of Internet use (6-point scale, from "less than once in 2 weeks" to "several times daily"), length of average use (6-point scale, from "15 min or less" to "over 4 h"), and conditions of use (5-point scale, from "always alone" to "always with others").

2.2.2. Motivation for using the Internet questionnaire

This questionnaire consisted of 42 items and was based on previous similar instruments (Amiel & Sargent, 2004; D'Ambra & Rice, 2001; Papacharissi & Rubin, 2000). The items referred to motives for using the Internet in four categories: interpersonal relationships and communication ("to tell people what I think"), entertainment and pleasure ("it makes me excited"), information ("it's easy to find stuff"), and convenience ("I can stay anonymous"). The items were presented in random order, preceded by "I use the Internet because…"; participants were asked to respond to each item on a 9-point scale, from 1 ("absolutely don't agree") to 9 ("absolutely agree"). A total score—reflecting level of motivation for using the Internet—was calculated by adding up responses to all items. Mean score was 255.38, with a standard deviation of 54.19. Internal consistency (Cronbach alpha) was found to be 0.92.

2.2.3. Types of use of the Internet questionnaire

Based on Hamburger and Ben Artzi (2000) and adjusted to more current online uses, this questionnaire included items pertaining to eight main Internet applications referring to three types of functions: personal and individual use (e.g., search engine), use of software (e.g., FTP), and group communication (e.g., forum). For each use, a respondent was asked to rate, on a 9-point scale (1 = never; 9 = often), the frequency of use. Range of possible scores was from 8 (very low use) to 72 (very high use). The mean for this scale was 46.73, with a standard deviation of 10.76.

Two instruments were used to measure well-being (Gross, 2004; Shaw, Hawkins, McTavish, Pingree, & Gustafson, 2006).

2.2.4. Revised UCLA loneliness scale

This scale, developed by Russell, Peplau, and Cutrona (1980), was used to assess participants' feelings about their interpersonal connections in order to measure level of loneliness. The questionnaire included 20 items (10 of which were phrased in reversed order) pertaining to a participant's satisfaction with interpersonal relationships and social life. For example: "I feel I miss the company of people," "I feel compatible with people around me." Participants were instructed to respond, on a 4-point scale (1 = never; 4 = often), in correspondence to the degree they felt as described in each item. Mean score was found to be 63.57, with a standard deviation of 8.96. Internal consistency (Cronbach alpha) was found to be 0.85.

2.2.5. Rosenberg self-esteem scale

This questionnaire, developed by Rosenberg (1965), aimed at measuring a participant's perceived self-value. The scale contained 10 items, half of which were reversed (e.g., "On the whole, I am satisfied with myself," "At times, I think I am no good at all"). Respondents were asked to rate, on a 4-point scale (from "strongly agree" to "strongly disagree"), the extent to which they felt as described in each item. In the present study, the scale mean was 32.38 and the standard deviation 5.14. Internal consistency (Cronbach alpha) was found to be 0.83.

In addition to these five questionnaires, an information form was administered to participants, asking about hearing status and length, parents' hearing status, birth place, age, gender, and mother-tongue language.

2.3. Procedure

Schools were contacted after receiving ethics approval from the Education Ministry. All schools contacted agreed to cooperate with the project. Parents were asked for consent and none of them refused. The participants were tested in their school classrooms by group administration, where they filled out questionnaires individually on an anonymous basis (to enhance the likelihood of genuine answers). All the questionnaires were administered in one session. All eligible students attending school at the time of data collection participated, and all but one filled out all the study questionnaires properly. Filling out the questionnaires took approximately 30 min for hearing participants and 45 min for hearing-impaired participants. A few deaf participants did not understand specific terms in different questionnaire items, and these were then communicated to them in sign language. Questionnaires of participants either of whose parents was deaf or for whom Hebrew was not their mother tongue were excluded from the study, as these factors could cause confounding variance.

3. Results

3.1. Motivation for using the Internet

We hypothesized that hearing-impaired adolescents, because of their communication handicap, would have higher motivation for using the Internet than would an equivalent hearing group. Table 1 shows the means and the standard deviations of the degree of motivation for using the Internet for each group and comparisons by age group and gender. ANOVA performed on these data revealed that hearing-impaired adolescents were indeed more motivated ($M = 281.78$) to use the Internet than were those in the equivalent hearing group ($M = 232.22$) ($F = 54.83$; df = 1206; $p < .0001$). All other main and interaction effects, regarding age and gender, were found insignificant ($p > .05$). Follow-up tests

Table 1
Means and standard deviations of level of motivation for using the Internet, by hearing status, gender, and age group

Gender	Adolescence stage		Hearing-impaired	Hearing
Boys	Early	M	282.83	238.03
		SD	45.17	56.91
		n	28	34
	Late	M	285.26	223.22
		SD	38.78	58.48
		n	23	22
Girls	Early	M	271.97	230.50
		SD	46.47	49.44
		n	24	34
	Late	M	286.84	229.18
		SD	44.05	44.69
		n	25	24
Total		M	281.78	232.22
		SD	43.54	52.12
		n	100	114

revealed that this difference was consistent in both genders and in both age groups. The same type of finding emerged for all four types of motivations (all p's $< .0001$): the hearing-impaired had higher scores than the hearing participants, whereas no age and gender interactions were found to be significant.

3.2. Characteristics of Internet use

Our second hypothesis stated that hearing-impaired adolescents, across gender and adolescence stage, would use the Internet more intensively than equivalent hearing adolescents. Table 2 presents the parameters of overall use of the Internet in these groups.

ANOVA performed on these data revealed that deaf adolescents indeed scored higher on intensity of Internet use ($M = 48.39$) than did their hearing counterparts ($M = 45.27$) ($F = 5.76$; df $= 1206$; $p < .05$). Furthermore, it was found that, on average, boys used the Internet more intensively than did girls ($M = 48.89$ versus $M = 44.57$, respectively) ($F = 9.34$; df $= 1206$; $p < .01$), and that younger adolescents used it more intensively than did older adolescents ($M = 48.27$ versus $M = 44.77$, respectively) ($F = 6.79$; df $= 1206$; $p < .01$). None of the interaction effects was significant.

In the next step, we compared the four specific aspects of using the Internet: length of period, frequency of use, length of time of average use, and conditions of use. Table 3 presents the means and standard deviations of these comparisons. MANOVA performed on these data, using the four subscales as dependent variables, revealed a main effect for hearing status ($F = 4.66$; df $= 4203$; $p < .01$) and for age group ($F = 3.39$; df $= 4203$; $p < .05$), and an interaction effect for hearing status X age group ($F = 2.82$; df $= 4203$; $p < .05$). For the hearing- status main effect, univariate ANOVAs showed that deaf adolescents used the Internet for a lengthier time ($F = 4.39$; df $= 1206$; $p < .05$) and more alone ($F = 10.05$; df $= 1206$; $p < .01$) than did hearing adolescents. For the age group main effect, univariate ANOVAs revealed that younger adolescents used the Internet more frequently than did older adolescents ($F = 8.71$; df $= 1206$; $p < .01$). For the interaction effect, univariate ANOVAs found a significant interaction effect for length of time using the Internet ($F = 9.08$; df $= 1206$; $p < .05$): although there was no difference in this parameter at early adolescence between hearing and hearing-impaired participants ($M = 3.96$ versus $M = 3.77$, respectively), late-adolescent hearing-impaired participants used the Internet for a longer period of time than did hearing adolescents ($M = 4.13$ versus $M = 3.13$, respectively).

3.3. Types of use of the Internet

Table 4 shows the means and standard deviations of the three types of Internet use examined. The data on types of use were analyzed by MANOVA, using the three types

Table 2
Overall Internet use, by hearing status, gender, and adolescence stage

	Hearing status		Gender		Adolescence stage	
	Hearing-impaired	Hearing	Boys	Girls	Early	Late
n	100	114	107	107	120	94
M	48.39	45.27	48.89	44.57	48.27	44.77
SD	10.96	10.41	10.93	10.18	11.00	10.17

Table 3
Means and standard deviations of characteristics of Internet use, by hearing status, gender, and adolescence stage

		Hearing status		Gender		Adolescence stage	
		Hearing-impaired	Hearing	Boys	Girls	Early	Late
	n	100	114	107	107	120	94
Duration of use	M	6.08	6.36	6.18	6.28	6.22	6.24
	SD	1.38	0.85	1.17	1.11	1.06	1.24
Frequency of use	M	5.04	5.10	5.17	4.97	5.28	4.81
	SD	1.15	1.17	1.14	1.17	0.96	1.32
Length of use	M	3.94	3.62	3.85	3.69	3.88	3.64
	SD	1.36	1.53	1.54	1.37	1.45	1.45
Conditions of use	M	1.79	2.20	1.96	2.06	2.11	1.88
	SD	0.84	0.88	0.96	0.81	0.94	0.80

Table 4
Means and standard deviations of types of use of the Internet, by hearing status, gender, and adolescence stage

		Hearing status		Gender		Adolescence stage	
		Hearing-impaired	Hearing	Boys	Girls	Early	Late
	n	100	114	107	107	120	94
Personal use	M	15.18	14.32	14.73	14.71	14.73	14.71
	SD	3.03	3.51	3.51	3.11	3.38	3.24
Group use	M	8.61	7.10	9.03	6.58	8.29	7.18
	SD	5.07	4.68	5.15	4.36	4.89	4.91
Use of software	M	24.62	23.88	25.17	23.28	25.25	22.91
	SD	6.40	5.58	5.94	5.88	6.52	4.93

of use as dependent variables. The MANOVA results indicated three significant main effects: for hearing status ($F = 2.91$; df = 3204; $p < .05$), gender ($F = 5.74$; df = 3204; $p < .001$), and adolescence stage ($F = 3.69$; df = 3204; $p < .01$). There were no significant interaction effects.

Univariate analysis revealed that although there was no difference in software use, deaf participants used the Internet for both more personal ($M = 15.18$ versus $M = 14.32$; $F = 5.18$; df = 1206; $p < .05$) and group ($M = 8.61$ versus $M = 7.10$; $F = 6.89$; df = 1206; $p < .01$) applications than did hearing participants. For the second main effect, although there was no difference in personal use, boys were found to use more group ($M = 9.03$ versus $M = 6.58$; $F = 13.83$; df = 1206; $p < .001$) and software ($M = 25.17$ versus $M = 23.28$; $F = 4.90$; df = 1206; $p < .05$) applications than did girls. For the third main effect, it was found that there was no difference in personal or group uses, but that younger participants used more software than did older participants ($M = 25.25$ versus $M = 22.91$; $F = 7.93$; df = 1206; $p < .01$).

3.4. Well-being and the use of the Internet

In order to examine the hypothesis that there is psychological gain in well-being for hearing-impaired adolescents who use the Internet intensively, we first compared the loneliness and self-esteem scores—the two variables defined as being indicative of well-being—of deaf adolescents to those of hearing adolescents. Table 5 shows the means and the

Table 5
Means and standard deviations of loneliness and self-esteem, by hearing status, gender, and adolescence stage

		Hearing status		Gender		Adolescence stage	
		Hearing-impaired	Hearing	Boys	Girls	Early	Late
	n	100	113	106	107	119	94
Loneliness[a]	*M*	61.49	65.39	62.82	64.31	63.18	63.18
	SD	8.35	9.12	8.18	9.66	8.76	8.76
Self-esteem	*M*	31.58	33.37	32.93	31.84	33.12	31.45
	SD	4.86	4.90	4.69	5.51	5.01	5.18

Note: One participant (hearing, early adolescent boy) was not included in this analysis because he did not complete these questionnaires.
[a] This score result is inversed: the lower the score, the higher the loneliness.

standard deviations of loneliness and self-esteem according to hearing status, gender, and adolescence stage. MANOVA performed on these data (using loneliness and self-esteem as dependent variables) revealed significant main effects for hearing status ($F = 4.94$; $df = 2202$; $p < .01$). All other effects were not found significant. Univariate analyses showed that hearing-impaired participants felt more lonely ($M = 61.49$ versus $M = 65.39$; $F = 10.37$; $df = 1205$; $p < .001$) and had a lower level of self-esteem ($M = 31.58$ versus $M = 33.37$; $F = 4.96$; $df = 1205$; $p < .05$) than did hearing participants. Next, we compared the well-being of hearing-impaired participants according to the extent of Internet use. To do this, the well-being of 54 hearing-impaired participants who scored at or above the median (48) on the scale of Internet use (total score) was compared with that of 46 participants who scored below the median and with that of hearing participants. The results of these comparisons are shown in Table 6. A one-way MANOVA (using loneliness and self-esteem as dependent variables) revealed a significant group effect ($F = 4.72$; $df = 4418$; $p < .01$). Univariate analysis showed a significant effect for loneliness ($F = 7.95$; $df = 2210$; $p < .001$). Duncan's paired-comparison test showed that deaf participants with lesser Internet use felt more lonely than did either deaf participants with more Internet use ($p < .05$) or hearing participants ($p < .001$), while there was no significant difference in loneliness scores between deaf participants who used the Internet more intensively and hearing participants. Likewise, univariate analysis revealed a significant effect for self-esteem ($F = 5.48$; $df = 2210$; $p < .01$), while the Duncan's test showed that deaf participants with lower Internet use had a lower self-esteem than did either deaf participants with higher Internet use ($p < .05$) or hearing participants ($p < .01$). There was no significant statistical difference in self-esteem between deaf participants with high use of Internet and hearing participants.

Table 6
Means and standard deviations of loneliness and self-esteem of hearing-impaired and hearing participants

		Hearing-impaired		Hearing (*n* = 113)
		Lower use of the Internet (*n* = 54)	Higher Use of the Internet (*n* = 46)	
Loneliness	*M*	59.86	63.40	65.55
	SD	7.95	8.47	9.01
Self-esteem	*M*	30.43	32.93	33.09
	SD	4.85	4.56	5.29

4. Discussion

The results of this study clearly supported the hypotheses by showing the following: (a) hearing-impaired adolescents are motivated to use the Internet more than are their hearing counterparts; (b) hearing-impaired adolescents use the Internet more intensively than do their hearing counterparts, and use by the hearing-impaired is characterized by lengthier time spent on the Internet and more solitary activities; (c) hearing-impaired adolescents, although using Internet software (e.g., search engines) in similar fashion to their hearing counterparts, use personal and group-communication tools more than do the latter; (d) while hearing-impaired adolescents generally possess a lower level of well-being (as reflected by the degree of loneliness and of self-esteem) than their hearing counterparts, the former who use the Internet more intensively have a level of well-being similar to that of hearing adolescents.

Given the cross-sectional nature of the study design, the latter findings cannot be inferred to be necessarily causal; that is, it is methodologically impossible to argue that the use of the Internet caused differential well-being. However, the relationships found could establish grounds for a hypothesis—to be tested in future research—that the use of the Internet is indeed a *causal* factor in influencing the positive psychological experiences of hearing-impaired adolescents. Based on previous research, as cited earlier, it seems that this hypothesis is true, and that the interrelationship of Internet use and well-being is caused by the special opportunities that cyberspace and online communication provide people with hearing deficits. Future research, however, should examine these relationships closer, using more rigorous methodology. In addition, effects of possible moderating variables should be tested, such as those related to family (e.g., number of siblings, age of parents), personality characteristics (e.g., extraversion–introversion), and other psychologically-relevant factors.

It seems there are two independent factors that might be responsible for the ability of Internet use to significantly contribute to and promote the well-being of the hearing-impaired, beyond its utilitarian contribution to hearing people. First, the Internet provides a unique, convenient, non-auditory communication tool by which deaf people can efficiently enhance their communication with others, as well as access numerous information resources without having to use special means. This advantage should be regarded not only as technical or practical but also, and perhaps primarily, as *psychological*: a deaf person can interact —as never before—with people and resources in ways similar to a hearing person. This special experience certainly serves efficiency and utility; however, it also directly relates to a person's sense of ability, control, and independence.

Second, as a result of using a communication tool that is mainly based on textuality, invisibility, and anonymity (in addition to other unique features), deaf people experience equality and lack of (or much decreased) inferiority in comparison to non-deaf under these circumstances. This psychological factor, too, contributes to their feelings of security, confidence, elevated mood, and connectedness. In other words, it appears that deaf people who regularly use the Internet go through *a personal empowerment process*. This assertion is based on the common view of personal empowerment as a concept that entails personally experienced factors, such as being able to make personal decisions, exercise critical thinking, and access relevant resources (Wallerstein, 1992), having a personal sense of the *power to* act efficaciously to bring about desired results (Boehm & Staples, 2002) and the *power over* obstacles and resistance, and experiencing personal growth as a result

of developing skills and abilities and gaining a more positive self-definition (Staples, 1990). We can clearly see how using the Internet may directly and effectively promote all these important psychological determinants for the personal empowerment of deaf people.

The view that Internet use is positively related to deaf users' well-being and personal empowerment is consistent with theoretical arguments and research findings from investigations of these kinds of relationships in other "challenged" or minority populations, as well as studies on the contribution of the Internet to the well-being of people in general (Amichai-Hamburger, 2007; Amichai-Hamburger & Furnham, 2007). Among the populations that such relationships have been found are the medically ill (D'Alessandro & Dosa, 2001; Metcalf, Tanner, & Coulehan, 2001), normal adolescents (Gross, Juvonen, & Gable, 2002; Valkenburg & Peter, 2007b; Valkenburg, Peter, & Schouten, 2006), the mentally ill (Sanyal, 2006), cancer patients (Sharf, 1997; Street, 2003), the elderly (Fuglsang, 2005; Shapira, Barak, & Gal, 2007), parents of children with special needs (Harris, 2004), the poor (Mehra, Merkel, & Peterson Bishop, 2004), the sexually marginal (Rosenmann & Safir, 2005), and refugees and immigrants (Hiller & Franz, 2004; Siddiquee & Kagan, 2006; Tsai, 2006). It is argued, therefore, that—against common popular attitudes—using the Internet in many ways have important positive impact on many people, beyond the simple use for entertainment and escape (that have positive emotional and social implications too; Whitty & McLaughlin, 2007).

This overall picture reinforces the view in regard to the potential of the Internet to foster empowerment of its users. Apparently, the personal empowerment process that users undergo is promoted through several factors that characterize the cyberspace environment: invisibility, anonymity, continuous and constant availability, easy access to massive amounts of information, and broad attainability of individual and group support. These factors—individually and in combination—produce unique and strong psychological effects on individuals that, in turn, initiate and foster the empowerment process. Closer psychological research is still needed to better understand the mechanisms by which this process is activated and their possible relationship with situational and personal variables.

The results of the current study—assuming that the relationships found are indeed causal—have important implications: Encouraging hearing-impaired adolescents (and perhaps younger and older people, too) to use the Internet may result in a promoted well-being and empowerment experience among this population. The implication of such a result could easily be transformed into practical policy and guidelines, perhaps accompanied by the necessary training and support and the provision of the necessary equipment. We believe that deaf adolescents who do not use the Internet, or who do so much less, may quickly learn its technical and personal advantages and come to like this activity. Educators and counselors who are involved in the special area of deafness should be aware of the unique features of the Internet and perhaps exploit it in a better way than sign language interpreters can do (Storey & Jamieson, 2004). Once again, the Internet, as seen here, is not just technology; it is an efficient vehicle to promote a better life for many human beings.

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