



Adolescents' identity experiments on the internet

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Abstract

The aim of this article is to investigate how often adolescents engage in internet-based identity experiments, with what motives they engage in such experiments and which self-presentational strategies they use while experimenting with their identity. Six hundred nine to 18-year-olds completed a questionnaire in their classroom. Of the adolescents who used the internet for chat or Instant Messaging, 50 percent indicated that they had engaged in internet-based identity experiments. The most important motive for such experiments was self-exploration (to investigate how others react), followed by social compensation (to overcome shyness) and social facilitation (to facilitate relationship formation). Age, gender and introversion were significant predictors of the frequency with which adolescents engaged in internet-based identity experiments, their motives for such experiments, and their self-presentational strategies.

Key words

chat • extraversion • identity • identity experiments • Instant Messaging • internet • introversion • self-presentation

INTRODUCTION

There is general consensus among researchers that the internet can offer its users tremendous opportunities to experiment with their identities (e.g. Katz and Rice, 2002; Rheingold, 1993; Smith and Kollock, 1999; Turkle, 1995; Wallace, 1999). Internet communication has several characteristics which may stimulate individuals to undertake identity experiments. First, it is characterized by reduced auditory and visual cues, which may encourage users to emphasize, change or conceal certain features of their physical self. Second, internet communication is anonymous, especially during the early stages of internet-based relationships. This anonymity may trigger people to feel less inhibited to disclose certain aspects of their self because the potential repercussions for real life are reduced (McKenna and Bargh, 2000; Spears et al., 2000). Finally, internet communication often happens in social communities that are isolated from those in real life. Such remote communities, which often involve limited commitment, may encourage identity experiments (Turtle, 1995).

Many identity researchers (e.g. Brinthaupt and Lipka, 2002; Harter, 1999; Hogg et al., 1995) regard the self and identity as two different, yet related constructs. They assume that while individuals have only one self, they have many different identities. These identities vary across relational contexts, such as the family, peer group and school (Harter, 1999; Hogg et al., 1995). To describe identity, we adopted a definition by Finkenauer et al. (2002: 2): '[I]dentity represents the aspect of the self that is accessible and salient in a particular context and that interacts with the environment.'

The self and its identities participate in social life through self-presentation. Self-presentation is defined as people's attempts to convey information about, and images of, the self and its identities to others (Baumeister, 1998). Jones and Pittmann (1982) identified several different self-presentational strategies. The most ubiquitous one is ingratiation, which can be defined as a strategy to convince others about the attractiveness of one's qualities. According to Jones and Pittman (1982), an ingratiation wants to be liked and considered attractive. A second self-presentational strategy is intimidation. In Jones and Pittman's view, the intimidator does not want to be liked, but he or she wants to be feared and believed. A third self-presentational strategy is self-promotion. A self-promoter wishes to convince others of his or her competence and wants to be respected.

Both identity experiments and self-presentational strategies are most significant during adolescence. Adolescence is characterized by an increase of identities that vary as a function of the relational contexts in which the adolescent participates (Harter, 1999). A critical developmental task in adolescence is to transform these initially compartmentalized identities into an integrated self (Josselson, 1994; Marcia, 1993). Identity experiments are

important to synthesize the variety of identities that emerge during early adolescence (Brinthaupt and Lipka, 2002; Harter, 1999).

There is growing evidence that adolescents use the internet to experiment with their identities (e.g. Calvert, 2002; Lenhart et al., 2001; Maczewski, 1999; Turkle, 1995; Valentine and Holloway, 2002). For example, Lenhart et al. (2001) found that almost one-quarter of adolescents who used email, Instant Messaging (IM) or chat indicated that they had pretended to be someone else. However, as yet there is no research about how and why adolescents engage in internet-based identity experiments. The main aim of this article is to fill this gap. We not only investigate which percentage of adolescents uses the internet to experiment with their identity, but also explore which self-presentational strategies they use and with which motives they engage in internet-based identity experiments. In addition, we investigate how adolescents' internet-based identity experiments, self-presentational strategies and motives differ for younger and older adolescents, boys and girls, and introverts and extraverts.

Age differences

Adolescent theories generally assume that pre- and early adolescence is characterized by an unstable self (Brinthaupt and Lipka, 2002; Harter, 1999; Shaffer, 1996). In this period, dramatic developmental transitions take place, including pubertal changes, cognitive-developmental advances and changing social expectations (Brinthaupt and Lipka, 2002; Harter, 1999). The combination of these changes makes pre- and early adolescence a critical time for the consideration of self and identities and thereby, identity experiments (Harter, 1999). Therefore, we anticipate that internet-based identity experiments will be more common in pre- and early adolescence than in middle and late adolescence.

We also expect that the need for self-presentation on the internet will be most significant among pre- and early adolescents. Young adolescents often engage in imaginative audience behaviour (Elkind and Bowen, 1979). They tend to overestimate the extent to which others are watching and evaluating and can be extremely preoccupied with what they appear to be in the eyes of others (Erikson, 1963; Harter, 1999). Based on these considerations, we investigate the following research question:

- RQ1: Do pre- and early adolescents tend to engage more often in: (a) internet-based identity experiments; and (b) various self-presentational strategies, than middle and late adolescents?

Gender differences

To date, there is no research on gender differences in adolescents' internet-based identity experiments. The more general literature on gender differences in identity development is only of limited use because it has

yielded inconsistent results. Some studies suggest that the identities of girls are more strongly developed (e.g. Erikson, 1963), whereas other studies suggest that the identities of boys are more strongly developed (e.g. Archer, 1985; Grotevant et al., 1982). Yet further studies have found that boys and girls do not differ with respect to their identity development (e.g. Allison and Schultz, 2001; Meeus et al., 1999).

There is no research on gender differences in internet-based identity experiments. However, earlier research on gender differences in video and computer games and communication technologies may inform the present study. When video games became popular among large groups of adolescents in the 1980s, a series of studies demonstrated that boys spent about three times as much time on playing video games than girls (e.g. Dominick, 1984; Kubey and Larson, 1990; Lin and Lepper, 1987). This was regarded as a serious problem in the 1980s by some educators, because it was feared that the differential use in video games between boys and girls would increase the gender gap in access to technology (e.g. Greenfield, 1984; Kinder, 1991).

However, increasingly in the past decades, initial worries about girls' moderate use of video games have been abandoned. Although boys still tend to play video games three to five times as much as girls, the total time that boys and girls spend on a computer no longer differs significantly (Roberts et al., 1999; Valkenburg, 2004). Recent studies also show that girls enjoy playing web games on the internet as much as boys (Valkenburg and Buijzen, 2003; Valkenburg and Soeters, 2001). However, boys and girls still differ in the type of games that they prefer to play. Whereas boys more often prefer fantasy games with violent and adventurous themes, girls tend to prefer games based on reality involving themes with realistic or familiar characters (Subrahmanyam and Greenfield, 1998; Subrahmanyam et al., 2001).

Adolescents' favourite web activities also differ significantly between boys and girls. Boys prefer to download games and video clips more often, whereas girls prefer to email and send digital cards on the internet. Girls also have a clearer preference for chat and IM (Valkenburg and Buijzen, 2003). This gender-specific preference for internet-based communication technologies is not surprising. If one investigates the history of communication technologies, it has usually been females who first embraced such technologies. This had begun already when the telephone was introduced (Rakow, 1988) and one century later, the mobile phone seems to be following the same pattern. Market research has shown that it is again women, particularly teenage girls, who are the trendsetters for mobile phone use. In the past few years, IM can be added to the list of technologies which satisfy pre-adolescent girls' relatively high need for communication and social interaction (see also Lenhart et al., 2001; Valkenburg, 2004).

Finally, research on gender differences in self-presentation on the internet clearly suggests gender-specific preferences. Most of these studies have focused on the analysis of personal homepages. According to a review of personal homepage studies by Döring (2002), the homepages of males and females display gender-specific self-presentational strategies. Whereas males seem to emphasize their status and competence, women tend to present themselves as nice and attractive. They often use floral designs and pastel colors and opt more often for less sophisticated technology. Based on these results, we formulate the following research question:

RQ2: How do girls and boys differ in: (a) their tendency to engage in internet-based identity experiments; and (b) their self-presentational strategies on the internet?

Differences between introverts and extraverts

Studies on the social consequences of the internet have suggested opposing hypotheses on how introverts and extraverts may use the internet (Gross et al., 2002; Kraut et al., 2002). The rich-get-richer hypothesis states that the internet will be used mainly by extravert and outgoing adolescents, who will use the web to add more contacts to their already impressive reservoir of friends (Kraut et al., 2002; Walther, 1996). The social compensation hypothesis, by contrast, proposes that the internet will be used especially by introvert and socially anxious adolescents, who have difficulty developing friendships in their real-life environment. The reduced visual cues provided by the internet may encourage these adolescents to overcome the shyness and inhibition that they typically experience in real-life settings (McKenna and Bargh, 2000).

Empirical studies on the impact of introversion on internet use have provided support for either the rich-get-richer (Kraut et al., 2002) or the social compensation hypothesis (Gross et al., 2002). An explanation for these discrepant findings may lie in the age differences in the two studies' samples. Kraut et al. (2002) drew on a combined sample of adolescents and adults, in which adults predominated, whereas Gross et al.'s (2002) study was based on a sample of early adolescents. The discrepancy in the results suggests that age may moderate the relationship between introversion and internet use. Early adolescents may be more susceptible to social compensation effects than middle and late adolescents because of concerns about interpersonal identity and fear of social rejection peak in early adolescence (e.g. Schaffer, 1996). Based on these considerations, we investigate two further research questions:

RQ3: How is introversion related to: (a) the tendency to engage in internet-based identity experiments; and (b) self-presentational strategies?

- RQ4: Does the effect of introversion on: (a) the tendency to engage in internet-based identity experiments; and (b) self-presentation, differ for younger and older adolescents?

Adolescents' motives for internet-based identity experiments

The final aim of this article is to explore adolescents' motives for engaging in internet-based identity experiments. Research on people's motives for media use falls traditionally within the uses and gratifications paradigm. A small – but growing body – of research has focused on people's motives for using the internet (Ferguson and Perse, 2000; Papacharassi and Rubin, 2000; Perse and Greenberg Dunn, 1998; Valkenburg and Soeters, 2000) and IM (Leung, 2001). However, as yet there is no research on adolescents' motives for internet-based identity experiments and how these motives may vary with age, gender and introversion. Therefore, we investigate the following broad research questions:

- RQ5: What are adolescents' motives for engaging in internet-based identity experiments?
- RQ6: How do these motives differ for younger and older adolescents, boys and girls and introverts and extraverts?

METHOD

Sample and procedure

Six hundred 9- to 18-year-olds ($M = 13.37$, $SD = 1.98$) participated in a survey study. These adolescents were recruited from three elementary and three middle and high schools in an urban district (Haarlem) in the Netherlands. These schools consisted of primarily white, native-speaking Dutch adolescents. The schools were chosen in such a way that they represented adolescents of all educational and socio-economic levels. The sample consisted of 317 (52.8%) boys and 283 (47.2%) girls.

The questionnaire consisted of three parts. In the first part, the adolescents identified their age, grade and gender and completed a 10-item introversion scale (Feij, 1979; Feij and Kuiper, 1984). Then, the adolescents were asked if they had ever used chat or IM on the internet. Only the adolescents who had ever used these completed the second part of the questionnaire, which included questions about online communication and a series of questions related to identity experiments. At the end of the second part, the adolescents were asked if they had ever pretended to be someone else while being online. Only those adolescents who answered positively to this question completed the third part of the questionnaire, which focused on their self-presentational strategies. Respondents were told that their responses to the questionnaire would be treated anonymously. Completing the questionnaire took about 15 minutes.

Measures

Introversion: we used the introversion subscale of the Adolescent Temperament List (Feij, 1979; Feij and Kuiper, 1984). This scale consists of 10 items, such as 'I don't talk easily about my problems' and 'I am shy around strangers'. The response categories for each of the items ranged from 1 ('completely agree') to 5 ('completely disagree'). The 10 items formed a one-dimensional scale, with a Cronbach's alpha of .77.

Internet-based identity experiments: respondents were asked whether they had ever pretended to be somebody else while communicating on the internet. The response categories were 1 ('never'), 2 ('sometimes') and 3 ('often'). Because we are interested in whether adolescents experiment with their identity at all, this item was dichotomized.

Self-presentational strategies: we asked respondents to remember a specific situation when they had pretended to be someone else. This was followed by open-ended questions on who they had pretended to be, with whom they chatted on that specific event and why they had pretended to be someone else. Adolescents' open-ended responses were coded according to the following categories, pretending to be:

- 1 an older person;
- 2 a more macho person;
- 3 a more beautiful person;
- 4 a more flirtatious person;
- 5 of the opposite gender;
- 6 a real-life acquaintance (i.e. a parent, friend or sibling);
- 7 an elaborated fantasy person; and
- 8 a residual category.

Because the open-ended questions allowed for multiple answers (e.g. older and more beautiful), for each respondent, each coding category was coded as being present (= 1) or absent (= 0) in the response. Two independent judges coded the responses. Inter-coder reliabilities, as measured by Cohen's Kappa, ranged from .80 (residual category) to .96 (pretending to be an older person).

Most of the adolescents' open-ended responses related to the self-presentational strategies identified by Jones and Pittman (1982). Pretending to be more beautiful and flirtatious falls under the ingratiation strategy. Pretending to be older falls under the self-promotional strategy, whereas pretending to be more macho falls under self-promotion as well as intimidation. The remaining categories (i.e. a person of the opposite gender, a real-life acquaintance and elaborated fantasy person) could not be classified as any of the self-presentational strategies identified by Jones and Pittman.

Adolescents' motives for internet-based identity experiments: we measured this with 10 items that reflected different psychosocial motives. Examples of

these items include: 'I pretend to be someone else on the internet . . . to feel less shy', 'to explore how people react towards me' or 'to make it easier to meet new people'. The adolescents were asked to specify how much each of the statements reflected their own motives for internet-based identity experiments. The response categories ranged from 1 ('never') to 3 ('often').

Data analysis

The dependent variables 'internet-based identity experiments' and the various self-presentational strategies are dichotomies. For these variables, we estimated logistic regressions with age, gender and introversion as independent variables. The various motives for internet-based identity experiments are metric variables that allowed for ordinary least-square regressions. To test whether the interaction between age and introversion significantly contributed to the prediction of internet-based identity experiments and self-presentational strategies (as suggested in research question 4), we estimated hierarchical regressions with age, gender and introversion in the first block and the age X introversion interaction in the second. If an interaction effect turned out to be significant, we probed the resulting conditional effects post-hoc to see whether they significantly differed from zero. Post-hoc probing presents a rigorous testing of interaction effects, which results in a more thorough understanding of these effects (Aiken and West, 1991).

RESULTS

Univariate analyses

The first aim of our survey study was to investigate which percentage of adolescents experiment with their identity and which self-presentational strategies they use. Of the 600 adolescents surveyed, 82 percent indicated that they use chat or instant messaging on the internet at least sometimes. Of the adolescents who used chat or IM, 50 percent ($N = 246$) reported that they experimented with their identity at least sometimes while being online. The 9- to 12-year-olds (72%) reported such experiments significantly more frequently than 13- to 14-year-olds (53%) and 15- to 18-year-olds (28%), $\chi^2 [df = 1; N = 493] = 61.15, p < .001$. There were no significant differences in the percentages of boys and girls and of introverts and extraverts who engaged in internet-based identity experiments.

Table 1 lists the eight self-presentational strategies for younger and older adolescents, boys and girls and introverts and extraverts. The most common self-presentational strategies mentioned by adolescents were pretending to be:

- an older person;
- a real-life acquaintance;

• Table 1 Adolescents' internet-based self-presentational strategies

SELF-PRESENTATIONAL STRATEGY	ENTIRE SAMPLE %	9–13 YEAR-OLDS %	14–18 YEAR-OLDS %	BOYS %	GIRLS %	INTROVERTS %	EXTRAVERTS %
Older person	49.8	53.2	44.0	39.8	59.2	40.4	56.3
More macho person	2.9	–	–	4.2	0.8	5.1	0.7
More beautiful person	6.6	9.1	2.2	1.7	11.2	3.0	9.0
More flirtatious person	13.2	–	–	–	–	–	–
Opposite gender	9.5	–	–	–	–	–	–
Real-life acquaintance	17.7	–	–	22.0	13.6	–	–
Elaborated fantasy person	12.8	–	–	16.9	8.8	–	–
Other	10.7	–	–	–	–	–	–

Note: Subgroup comparisons reported in this table are significant at least at $p < .10$

- a more flirtatious person; and
- an elaborated fantasy person.

Pretending to be a person of the opposite gender, a more beautiful person and a macho persona were mentioned less frequently.

Younger adolescents, girls and extraverts significantly pretended more frequently to be an older person than older adolescents, boys and introverts. Boys and introverts presented themselves more often as a macho persona, whereas girls, younger adolescents and extraverts presented themselves more frequently as a more beautiful person. Finally, boys presented themselves more often than girls as a real-life acquaintance and as an elaborated fantasy person.

Multivariate analyses

Some self-presentational strategies (i.e. pretending to be a more macho person, a more beautiful person and of the opposite gender) were mentioned too infrequently to allow for meaningful logistic regression analyses. In the following multivariate analyses, we therefore concentrate on only the four most frequently mentioned self-presentational strategies.

Our first three research questions focused on the potential influence of age, gender and introversion on internet-based identity experiments and self-presentational strategies. Our fourth research question concentrated on the potential interaction effect of age and introversion on identity experiments and self-presentational techniques. To investigate these research questions, we performed five logistic regression analyses on the following dichotomous dependent variables:

- 1 internet-based identity experiments;
- 2 pretending to be an older person;
- 3 pretending to be a more flirtatious person;
- 4 pretending to be a real-life acquaintance; and
- 5 pretending to be an elaborated fantasy person.

The results of these analyses are presented in Table 2.

A strong influence of age on internet-based identity experiments emerged ($b = -.50$, $p < .001$). Consistent with our expectations, younger adolescents were significantly more likely than older adolescents to experiment with their identity (research question 1a). Age did not affect any of the self-presentational strategies (research question 1b).

Boys and girls did not differ in their likelihood to experiment with their identities on the internet (research question 2a). With respect to self-presentational techniques, however, we found a significant effect of gender on pretending to be an older person ($b = .79$, $p < .01$). Girls were more likely than boys to pretend to be an older person when experimenting with

• Table 2 Predictors of internet-based identity experiments and various self-presentational strategies

	INTERNET-BASED IDENTITY EXPERIMENTS (N = 493)	OLDER PERSON (N = 243)	FLIRTATIOUS PERSON (N = 243)	REAL-LIFE ACQUAINTANCE (N = 243)	ELABORATED FANTASY PERSON (N = 243)
<i>First block</i>					
Age	-.50*** (.06)	-.09 (.07)	-.02 (.11)	-.10 (.10)	.17 (.11)
Female	.11 (.20)	.79** (.26)	-.05 (.38)	-.59 (.35)	-.76 (.41)
Introversion	-.17 (.16)	-.21 (.22)	-.31 (.33)	-.30 (.30)	.41 (.32)
-2 log likelihood	598.23	325.62	188.39	221.82	178.26
<i>Second block</i>					
Age	-.50*** (.06)	-.08 (.08)	.08 (.13)	-.12 (.10)	.18 (.11)
Female	.12 (.20)	.82** (.27)	-.01 (.39)	-.59 (.35)	-.78 (.41)
Introversion	-.18 (.16)	-.07 (.23)	-.08 (.34)	-.40 (.32)	.42 (.44)
Age X introversion	.03 (.10)	.31* (.13)	.61** (.19)	-.13 (.15)	-.19 (.18)
log likelihood change	.08	6.36*	11.23**	.67	1.06
-2 log likelihood	598.15	319.26	177.16	221.15	177.21
Constant (full model)	.03	-.46	-1.92	-1.39	-1.53

Note: * $p < .05$, ** $p < .01$, *** $p < .001$ (z -test for regression coefficients, two-tailed; Chi-square test for log likelihood change). Cell entries are unstandardized logistic regression coefficients, standard errors in parentheses.

their identity. Gender did not affect any of the other self-presentational strategies (research question 2b).

Introversion had no main effect on identity experiments and self-presentational strategies (research question 3). However, for two of the four self-presentational strategies a significant interaction between age and introversion emerged (research question 4). Adding the interaction effect to the model significantly increased its explanatory power, as the changes in the $-2 \log$ likelihood indicate. Both for pretending to be an older person ($b = .31, p < .05$) and for pretending to be a more flirtatious person ($b = .61, p < .01$), the influence of introversion was conditional on age.

Post-hoc probing of these interaction effects revealed that, among the 9- to 11-year-olds, introverts were significantly *less* likely than extraverts to pretend to be an older or a more flirtatious person. Among the 12- to 15-year-olds, introverts and extraverts did not differ significantly in their likelihood of employing these two self-presentational techniques. However, among the oldest adolescents, the introverts were significantly *more* likely to pretend to be an older or more flirtatious person. This interaction effect did not occur for the general tendency to engage in internet-based identity experiments.¹

Motives for internet-based identity experiments

Research question 5 focused on adolescents' motives for experimenting with their identity on the internet. To investigate this research question, we factor analysed the 10 items designed to measure adolescents' motives for internet-based identity experiments. This factor analysis yielded three orthogonal

• Table 3 Factor solution for adolescents' motives for internet-based identity experiments

	FACTOR 1	FACTOR 2	FACTOR 3
I pretend to be someone else on the internet:			
<i>Factor 1: Social compensation</i>			
To feel less shy	.81	.11	.14
Because I dare to say more	.79	.12	.21
Because I can talk more easily	.79	.27	.06
To talk more easily about certain topics	.78	.12	.25
<i>Factor 2: Social facilitation</i>			
To make new friends	.27	.79	-.09
To get to know people more easily	.34	.73	.09
To get a date or relationship	-.05	.71	.27
<i>Factor 3: Self-exploration</i>			
To explore how others react on me	.01	.07	.75
To try out how it is to be someone else	.25	-.02	.66
Because I can think up how I will look	.28	.22	.62
Eigenvalue	3.87	1.28	1.14

factors which explained 63 percent of the variance. The individual items and their factor loadings are listed in Table 3.

Based on the results of the factor analysis, three scales were created: social compensation (four items, Cronbach's $\alpha = .85$; $M = 1.60$; $SD = .64$), social facilitation (three items, Cronbach's $\alpha = .67$; $M = 1.38$; $SD = .46$) and self-exploration (three items, Cronbach's $\alpha = .53$; $M = 2.06$; $SD = .57$).

Research question 6 focused on the influence of age, gender and introversion on the three motives. Table 4 shows that younger adolescents experimented more frequently than older adolescents with their identity to facilitate social interaction ($b = -.05$, $p < .05$). Girls engaged in internet-based identity experiments for self-exploration more often than boys ($b = .32$, $p < .01$) and social compensation ($b = .24$, $p < .01$). Finally, introverts engaged in identity experiments for social compensation more often than extraverts ($b = .20$, $p < .01$).

• Table 4 Predictors of motives for internet-based identity experiments

	SELF EXPLORATION (N = 246)	SOCIAL COMPENSATION (N = 246)	SOCIAL FACILITATION (N = 245)
<i>First block</i>			
Age	-.03 (.02)	-.02 (.02)	-.05** (.02)
Female	.32*** (.07)	.24** (.08)	.11 (.06)
Introversion	-.07 (.06)	.20** (.07)	.06 (.05)
R^2	.09***	.08***	.06**
<i>Second block</i>			
Age	-.02 (.02)	-.01 (.02)	-.05** (.02)
Female	.32** (.07)	.24** (.08)	.11 (.06)
Introversion	-.03 (.06)	.22** (.07)	-.04 (.05)
Age X introversion	.08** (.03)	.03 (.04)	-.03 (.03)
R^2 change	.03**	< .01	< .01
R^2	.12***	.08***	.06**
Constant (full model)	1.88	1.50	1.30

Note: * $p < .05$, ** $p < .01$, *** $p < .001$ (t -test for regression coefficients, two-tailed; F -test for R^2). Cell entries are unstandardized multiple regression coefficients, standard errors in parentheses.

For self-exploration, a significant interaction effect between age and introversion emerged ($b = .08, p < .01$). Again, this effect was not trivial, as the improvement of the model's explanatory power by 3 percent suggests. Post-hoc probing of the interaction effect indicated that, among the 9- to 12-year-olds, introverts experimented with their identity for self-exploration significantly *less* frequently than extraverts. Among the 13- to 17-year-olds, the influence of introversion on self-exploration gradually became stronger, indicating that older introverts were more likely to experiment with their identity. However, none of these influences for older adolescents approached conventional significance levels. For the remaining two motives, social compensation and social facilitation, no significant interaction effect between age and introversion occurred.

DISCUSSION

The main aim of our study was to investigate how often adolescents engage in internet-based identity experiments. Our results showed that early adolescents experimented with their identities significantly more often than older adolescents (research question 1). This result is consistent with general adolescent identity theories, which assume that early adolescence is a critical time for the consideration of self and identity and consequently, identity experiments. Our results are also in line with Livingstone and Bober (2003), who suggest that older teenagers use the internet more often to communicate with their existing personal network, whereas younger adolescents use it more frequently to communicate with strangers and play with their identities.

Younger adolescents did not significantly differ from older adolescents in most of their self-presentational strategies. According to our univariate analyses, younger adolescents presented themselves significantly more often as an older person. However, this effect disappeared in the multivariate analyses, in which gender and introversion were controlled. However, younger adolescents did tend to present themselves more often as beautiful than older adolescents did. This result may be due to younger adolescents' general tendency to play with their identity. Also, it may be attributed to commonly observed declines in self-esteem and perceptions of physical attractiveness in early adolescence (e.g. Kostanski and Gullone, 1998; Williams and Currie, 2000).

Research question 2 involved possible gender differences in internet-based identity experiments and self-presentational strategies. Our results showed that boys and girls did not differ in the frequency with which they experimented with their identities. However, boys and girls did differ on several self-presentational strategies. First, both the univariate and the multivariate analyses showed that girls pretended to be older more often than boys. An explanation may be that girls usually mature earlier than boys

(Allison and Schultz, 2001), which may lead to a stronger need to communicate with older persons.

Our univariate analyses showed some additional gender differences in self-presentational strategies. Whereas girls pretended to be beautiful more often, boys pretended to be macho more frequently. These findings are consistent with stereotypes of how boys and girls should behave in adolescence. Anonymous settings, such as chatrooms, often have strong norms towards gender-stereotyped behaviour (Jacobson, 2002; Turkle, 1995). Gender-stereotypical self-presentational strategies may be particularly salient in such settings (Postmes and Spears, 2002).

We found no significant main effects of introversion on internet-based identity experiments and self-presentational strategies (research question 3). We also did not find any interaction effects of age and introversion on adolescents' internet-based identity experiments (research question 4). However, we did find that among younger adolescents, the extraverts were more likely to present themselves as older and flirtatious; among older adolescents, the introverts were more likely to present themselves as older and flirtatious. Obviously, extraverts, who are less shy and more sociable than introverts, begin to use the internet at an earlier age to present themselves as older and flirtatious. In later adolescence, when a real need for cross-gender relations and self-presentation emerges (Aboud and Mendelson, 1996), it is the introverts, who have difficulty with self-presentation and social interaction in real life, who begin to use the internet to present themselves as older and more flirtatious.

Adolescents' motives for internet-based identity experiments

The most important motive to engage in internet-based identity experiments was self-exploration (i.e. to explore how others react), followed by social compensation (i.e. to overcome shyness) and social facilitation (i.e. to facilitate relationship-formation). The motive to engage in internet-based identity experiments for self-exploration was predicted only by gender. Compared to boys, girls experimented with their identity more often to explore their selves and investigate how they appear to be in the eyes of others. Girls are more likely than boys to experience decline in self-esteem during adolescence. Compared to boys, they are generally unhappier with their body and more likely to worry and ruminate about their problems (Azmitia, 2001; Harter, 1999). This decrease in self-esteem could encourage girls to use the internet more frequently than boys to explore and test certain aspects of their selves.

We also found an interaction effect of age and introversion for self-exploration. Both younger extraverts and older introverts in particular experimented with their identity for reasons of self-exploration. This

interaction effect of age and introversion bears similarities to the age–introversion interaction found for pretending to be older and more flirtatious. It is possible that extraverts begin to use the internet at an earlier age to explore different aspects of their selves. In later adolescence, when the need for identity exploration and experimentation becomes more acute for all adolescents, introverts in particular may take the opportunity to experiment with their identity for self-exploration.

The motive to experiment with one's identity for social compensation was predicted by gender and introversion. Girls and introverts experiment with their identity for reasons of social compensation more often than boys and extraverts. As discussed earlier, compared to boys, girls typically have lower self-esteem and are more dissatisfied with their physical appearance. Girls also have a greater need for self-disclosure than boys (Buhrmester and Furman, 1987). Together, these factors could induce girls to turn to internet-based identity experiments to overcome their shyness and disclose themselves without any repercussions in real life. Our finding that introverts experiment with their identity for reasons of social compensation is consistent with earlier evidence that the reduced visual and auditory cues provided by the internet may encourage introvert adolescents to overcome the shyness that they typically experience in real-life settings (Amichai-Hamburger et al., 2002; Gross et al., 2002; Hamburger and Ben-Artzi, 2000; Kraut et al., 2002).

Finally, the tendency to engage in internet-based identity experiments to facilitate relationship formation was negatively predicted by age. Early adolescents engage in identity experiments for social facilitation more often than older adolescents. This result is in line with research on adolescent friendships, which has shown that during early adolescence the number of friends increases rapidly. This emerging need to make new friends declines somewhat in later adolescence, when the quality of existing friendships increases (Aboud and Mendelson, 1996; Berndt and Hoyle, 1985; Schaffer, 1996).

Our study has demonstrated that the internet can play an important role in adolescents' identity exploration. Most of our results are in line with adolescent identity and friendship theories. We focused our study on the question of how and why adolescents engage in internet-based identity experiments, but we did not investigate their consequences. Future research should address both the short- and longer-term consequences for adolescents' sense of self, emotional well-being, and social adjustment.

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¹ The post-hoc probing analyses are available upon request from the authors.

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