ON-LINE FRIENDSHIPS

by

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Summary

The purpose of the study was to investigate the prevalence and quality of on-line friendships, to find which individual characteristics differentiate people who look for and form on-line friendship(s) from those who don't, and to discover factors which are of importance for the development of on-line friendship(s). 574 Internet users completed an on-line questionnaire.

The results showed that: (1) almost 50% of respondents had on-line friendship(s); (2) off-line friendships were better developed than on-line friendships. However, there was only a minor difference between the quality of the best off-line and best on-line friendships; (3) the Internet was a safe place for building personal relationships, especially for shy individuals; (4) people who felt lonely were more likely to turn to the Internet to find friends; (5) Internet usage and attitudes to the Internet were significant factors that differentiated those who looked for and formed friendship(s) on-line from those who didn't.

Key terms:

Friendship; On-line personal relationships; Internet; Internet users; Quality of friendship; Computer Mediated Communication; Shyness; Sociability; Attitudes to the Internet; Internet usage; Loneliness; Social support

Chapter 1

Introduction

1.1. The Internet

If one looks at many societies today one cannot imagine them without the Internet. The Internet is a world-wide broadcasting capability, a mechanism for information exchange, a medium for collaboration and interaction between individuals and their computers without regard to geographic location. Its roots go back as far as the 1960s when, at the height of the Cold War, the Advanced Research Projects Agency of the United States Department of Defence sought to develop a widely distributed communications network for the United States' military. As a result in the 1980s in the USA the ARPANET started functioning. For the military, the goal was to have a system of communication that would be fully functional even though one or more points might be destroyed by enemy attack. For many scientists who contributed to the emergence of the ARPANET the purpose was to create a means of communication that would allow any user or programme on any of the networked computers to be able to utilise any programme or subsystem on any other computer without having to modify the remote programme (Aikens, 1997). As individuals began to communicate over phone lines through computers, a broad range of applications made new forms of interaction possible. In 1971 two programmers at Bolt, Beranek and Newman (BBN) who wanted to communicate with one another through personal messages developed electronic mail, arguably the most important application of the new technology (Kalendarium, n.d.). By the early 1980s local computer networks began to spring up. These created a way for enthusiasts to network from their homes through a modem. Thousands of independent computer networks emerged and have eventually merged into the Internet.

The Internet has become more and more widespread. Nowadays 410 million people are online (Nua Ltd., 2000). This medium is not only about technology, access to

information or communication between people; it is also changing society. In a study carried out by D'Amico (1998) as much as 64% of respondents said that "using an online or Internet service is a necessity to me" (p. 1). A great number of researchers and scientists agree that the Internet is transforming both economic and social life (Wellman & Gulia, 1997; McQuillen, 2003). The Internet could change the lives of people as much as did the telephone in the early part of the 20th century and the TV in the 1950s. Today it is possible to do many activities in the virtual world without even leaving home. The Internet is the source of information through commercial services and web pages where people can get news, research products and financial information, look for a job, accommodation and so on. It is also a source of various kinds of entertainment, allowing for reading on-line books, listening to music, playing games, viewing erotic contents; it is also a new place for buying products, making travel reservations as well as performing bank transactions. Among the many functions mentioned above, people use the Internet for communication. It has become a structure that is an alternative method of communication through different applications such as electronic mail, chat rooms or instant messaging systems. All researchers agree that communication via the Internet, known as Computer Mediated Communication (CMC), is different from that in real life. "CMC is a relatively new area of study, but as computers have become an integral part of society, spanning education, industry and government, the field is growing significantly" (Ferris, 1997, para. 1). According to Ebbelink (1999) CMC is the exchange of information between persons by way of computer networks, this can be all kinds of information, for example text, images, audio, and video. Liu (2002) defines CMC as an "altered state of communication, including altered physical environments, altered time and space, and altered structures in communication" (Introduction, para. 1).

There are several different systems that can be used for computer-mediated communication:

- e-mail or electronic mail - users produce, send and receive mail that is stored on a server and can be accessed at any time. Usually e-mail consists of text messages but it is possible to attach images, video, audio, etc.;

- message boards or bulletin boards - public discussions held through computer networks on many different subjects. Single copies of articles stored in a publicly accessible place on the Internet can be read using a newsreader programme (more and more often these are accessible simply by using a web browser) and responded to either publicly by placing another message on the bulletin board, or privately by e-mail. It is possible to post messages and announcements, initiate discussions or ask questions to message board participants. Message boards support chronologically listed discussion threads that enable the user to read the entire discussion, from the initial to the most current posting (Excite Inc., 1999);

- IRC (Internet Relay Chat) and chat rooms - they enable real time communication between people in the form of posting short text messages that appear in a fast scrolling window. This resembles a text-based discussion, which can be held between two or more people. The difference is that while IRC requires a special programme in order to connect to servers that hold communication, chat rooms are available from a web page for everyone with a web browser. IRC is divided into channels devoted to different topics. Chat rooms also have their specified subjects of conversation (Caraballo & Lo, 2000);

- mailing lists (also called listservs from the servers that carry lists) are just communities of people sitting around and discussing one of their favourite topics by e-mail (Southwick, 1998). There are catalogues of such mailing lists available on the Internet (such as www.liszt.com) that can be browsed by the topic. After having subscribed to the list of interest, using e-mail one is provided with a periodical (e.g., weekly or daily) portion of information. This can be messages posted on the list by other users, and one can take part in the discussion by replying to others or posting one's own opinions - in this case those lists are called "discussion groups". Other forms of mailing lists are "newsletters" or "announcements", where a single writer (the list owner or moderator) broadcasts a periodical e-mail to a willing audience that do not participate directly;

- MUD/MOO (Multi User Dungeons/MUD Object Oriented) - synchronous system in which users can interact in real time using text messages. The difference between a MUD and a chat room is that in the former a situation is fictional and resembles a role-playing game in which the moderator describes (using text messages) the situation and the surroundings, and the participants (disguised as fictional characters) describe their actions and carry out dialogues (Ebbelink, 1999);

- instant message - programmes (such as IRC, gadu-gadu, ICQ, or MSN Messenger) that allow for contacting other persons in real time. Upon installation the user is registered in a server database that can be searched by other people (according to their personal profiles). If the person that we are interested in contacting is on-line, the exchange of synchronous text-based messages is possible. Audio and video recording as well as pictures can be also exchanged using this method;

- audio conferencing - the simultaneous connection of many computer users who exchange voice messages (telephone-like conversations over a computer network);

- video conferencing - real time video and audio communication between two or more people;

- whiteboard environments - virtual meetings where each participant can use the mouse to draw sketches on a whiteboard. As each user is drawing, every other user sees the updates almost immediately. Most whiteboard programmes also have a chat window where participants can type messages to one another.

The term CMC refers to both task-related and interpersonal, asynchronous and synchronous communication via computers and information manipulation, retrieval and storage. Asynchronous communication occurs where information sent by one party is stored and can be retrieved at any time by the receiver, who does not have to respond immediately (for example e-mail or the bulletin boards). Synchronous communication, for example through Multi User Dungeons, Internet Relay Chat or

audio/video conferencing refers to communication taking place in real time and requires simultaneous interaction between both communicating parties.

Today the Internet has become a new place where it is possible to talk and meet people without leaving home. Social linkages in the form of e-mail and discussion groups appeared in the first days of the Internet and have grown ever since (Parks & Floyd, 1996). It has been shown by Kraut, Mukhopadhyay, Szczypula, Kiesler and Scherlis (1999) that interpersonal communication is the dominant reason for using the Internet at home. According to Smolowe (1994) 80% of the Internet users go on-line to find social contacts, company and community, not only to find information. Interpersonal communication proves to be the main purpose for which people go on-line, according to the research published in 2001 by Pew Research Center (2000).

Similar results have been replicated by the research carried out in 2000 among students of Wageningen University, the Netherlands (Berezowski, 2001). Among all the functions the Internet can serve, communication is ranked at the top of the Internet users' priority lists.

Millions of people are now corresponding through electronic newsgroups, discussion forums, sending e-mails. Beginning and maintaining interpersonal relationships in the virtual realm is becoming increasingly more popular in our society. The Internet is a place where people are engaging in social interaction. In a survey carried out by D'Amico (1998) fully 94% of respondents reported that the Internet made it easier for them to communicate with friends and family, and 87% regularly used it for that purpose. The Internet has become a social tool that is linking together people all across the globe – virtual communities are emerging. To date, however not much is known about the phenomenon of virtual communities and about on-line relationships.

Gerlander and Takala (1997) in their article "Relating Electronically, Interpersonality in the Net" admitted that the effect of CMC on human relationships has been a widely

discussed subject in CMC research. It is not surprising that researchers are debating the influence of CMC on human relationships, taking into account the role of interpersonal relations, especially close relationships, in both physical health and psychological well-being. Evolutionary theories have argued that maintaining relationships with others constitutes an essential human need, in that being cared for and belonging to a social group enhances the likelihood of survival (Voss, Markiewicz, & Doyle, 1999). According to Smith and Mackie (2000) close relationships with other people can make us healthy as well as happy. In a survey by Larson (1990) respondents were paged electronically on many random occasions, cueing them to fill in self-report scales. The results showed that they were the happiest with friends, followed by being with family, and least happy when alone. There is a large body of evidence supporting the view that social support – coping resources provided by significant others - can positively affect our health as well as our psychological well-being (Salvey, Rothman, & Rodin, 1998). For example, the chance of surviving for more than one year after a heart attack is more than twice as high among elderly people who have close people to count on than among those who do not have such emotional support. According to Berkman and Syme (1979, as cited in Smith & Mackie, 2000) social support also has an impact on people's overall death rate. The value of close relationships, such as high levels of intimacy and affection as well as opportunities for self-disclosure, companionship and enjoyable interactions, produces those benefits (Rook, 1987; Smith & Mackie, 2000).

From the large body of research available, a picture of the beneficial influence of interpersonal relationships for human beings has emerged. The concept of interpersonal relationships has become a very popular area of research. Therefore, today we have great deal of knowledge about factors that are important in a real life friendship, about real life relationship development and impression formation. From this knowledge we can cautiously try to deduce how people behave in a virtual world.

1.2. Friendship

In order to answer the question about the possibility of on-line friendships the meaning of friendship in general as well as the process of its emergence should be understood.

Friendship is a special kind of relationship between individuals "found all over the world, in all societies, in all classes, at all ages, and in all times" (Bunt, 1999, p. 5). Although everyone has some idea regarding the meaning of friendship, and more and more research in social psychology is concentrating on friendship, including adult friendships (Adams & Blieszner, 1994), cross-sex friendships (Gaines, 1994), and the role of friendships in the lives of gays and lesbians (Nardi & Sherrod, 1994), it is still very difficult to come up with a clear definition of friendship. The most often used description of friendship states that friendship is a voluntary, intimate, personal relationship (Allan, 1989; Bunt, 1999; and others). According to Krackhardt (1992, as cited in Bunt, 1999) there are three necessary conditions for the emergence of friendships. Firstly, two people should have a considerable amount of interaction with each other, secondly, there has to be mutual affection between two individuals and finally, a history of interactions has to be built up. A close friendship, which involves spending a great deal of time together, interacting in a variety of situations, excluding others from the relationship, and providing mutual emotional support (Kenny & Kashy, 1994), should be contrasted to a casual friendship. Baron and Byrne (1997) have stated that "a casual friend is someone who is "fun to be with", while a close friend is valued for such qualities as generosity, sensitivity, and honesty" (p. 278). An intimate relationship means that partners engage in self-disclosure, express their emotions, provide and receive support, experience trust, engage in physical contact, and generally relax with one another (Nonsour, 1992).

According to research findings there are three key variables in friendships: proximity (or frequency of meeting), similarity (in interests and values) and physical attractiveness. These variables have been shown to be important in a variety of well-designed studies.

Whether we like it or not physical attractiveness has been proved to be one of the main determinants of interpersonal attraction. According to Walster, Aronson, Abrahams and Rottman (1966) if initial attraction is not there, that is often the end of the story. This appears to be the case not only for potential intimate relationships but also for possible friendships as well. "We like and make more positive judgments about physically attractive people than about less physically attractive people" (Tesser, 1995, p. 285). The common stereotype that attractive people are warm, friendly, and socially confident is illustrated in a study by Snyder, Tanke and Berscheid (1977). Male college students were shown photographs of women with whom they thought they would have an intercom conversation. The photographs did not show the true conversation partner. Half of the males were given the photographs of very attractive women while the other half saw the photographs of women who were less attractive. Men who thought they were talking with very beautiful women evaluated them more positively. Those women were described as self-confident, outgoing and clever. According to independent observers, the photographs influenced the behaviour of both male and female participants. Those men who thought the partner was a very attractive woman acted in a more sociable, warm, interesting and outgoing way than those who thought they were talking with a less attractive woman. The women responded differently to the two conversational patterns. Those whose partners thought they were very beautiful were also described by independent observers as more sociable, warm, outgoing and confident. The results of this study show that when we think people are attractive, we interact with them in a way that brings out the best in them. The more attractive people are also described as happier, more sociable, warmer, nicer, more pleasant and intelligent and as having a more successful life. This is true not only in the case of possible romantic partners (Walster, et al., 1966), but also in the case of teachers' judgments of students' performance and even in the case of experienced personnel consultants' judgments of job candidates (Tesser, 1995).

Physical proximity and repeated exposure play a large role in attraction and relationship formation. Even infants are more likely to smile at photographs they have

seen before than at ones they see for the first time (Brooks-Gunn & Lewis, 1981). It appears that we become friends or partners of those people whom we meet most often – the girl or boy from the neighbourhood, the people we work with at the same company, the people from the same club, the people we see on the subway every morning. A large body of research has demonstrated that people are much more likely to begin relationships with others who are regularly in close physical proximity, and far less likely to do so with those who are even a short additional distance away. For example, Caplow and Forman (1950, as cited in Tesser, 1995) demonstrated that we are more likely to become well acquainted with the person sitting next to us in class or assigned to the room next to us in a dorm than with one just a few seats or rooms away. A study of residents in a married-student housing complex found that friendships tended to form among those who lived near one another (Festinger, Schachter, & Back, 1950, as cited in Smith & Mackie, 2000). Zajonc (1968, as cited in Baron & Byrne, 1997) demonstrated that frequent contact with any mildly negative, neutral, or positive stimulus leads to more and more positive evaluation of that stimulus. People tend to respond with at least mild discomfort to anything or anyone new. With repeated exposure, the feeling of anxiety decreases, and the new something or someone gradually becomes familiar. This process has been shown in many studies. For example, Moreland and Beach (1992) showed that the longer a stranger attended the class, the more she was liked.

One of the reasons why physical proximity influences our liking of other people is our anticipation of future interaction with them: proximity makes us believe that sooner or later we will meet that person again. If we know that we may meet that person again we tend to be nicer. Kellermann and Reynolds (1990) suggest that anticipation of future interaction prompts communication partners to act in a more friendly manner, to seek more information about one another and to enact more relationally positive communication.

Another fact about attraction and relationships which appears in virtually every social psychology text is that we like others who are similar to us. Research has shown that

we tend to be more attracted to those who are similar to us and who share our opinions (Aronson, 1995). There is a large body of evidence that people who are attracted to one another and become friends or romantic partners tend to match on such factors as age, education, religion, and health (Tesser, 1995), personality (Boyden, Carroll, & Maier, 1984), abilities (Senn, 1971), and economic status (Byrne, Clore, & Weorchel, 1966, as cited in Tesser, 1995). According to Smith and Mackie (2000) if two people are similar, they are more likely to have positive interactions, to believe that they are liked in return, and to reinforce each other's attitudes and beliefs. Researchers agree that if we know that someone is similar to us, we usually assume that that person will like us (Aronson, 1995). Researchers also concur that being liked by another person is one of the strongest reasons for liking that person (Condon & Crano, 1988).

Hence, research results have shown that proximity, physical attractiveness and similarity play a large role in attraction and relationship formation. Social scientists have tried to understand why these factors are so important. There are several theories about personal relationships, which provide us with different perspectives on understanding many observations concerning attraction and relationships, including why we like those who live near us, these who are physically attractive, and those who have similar attitudes to ours. Those theories try to explain and understand the antecedents of interpersonal attraction, also what turns acquaintances into friends and the process of friendship development.

One of the best known theories is the group of reinforcement theories based on principles of classical conditioning. According to the advocates of this theory we like people who provide us with rewards, regardless of the relationship between the other person and the rewarding event or state of affairs (Bunt, 1999). The individual tends to like the person if he or she experiences a reward in the presence of that person. In order for voluntary relationships such as friendship to develop and deepen, each partner must receive benefits and rewards. Strength of a relationship is directly related to this, namely "the more often a person is rewarded and the more a person values the reward, the more this person likes the rewarding person" (Bunt, 1999, p. 9). These

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theories also point out that we are most rewarded by people with similar beliefs and attitudes; thus we choose as friends people who are similar to us.

Exchange theory is an elaboration of the reinforcement theories. According to this theory "people try to maximize their gains and minimize their costs in relationships" (Miell & Dallos, 1996, p. 348). Partners will reciprocate the rewards delivered, and they stay in a relationship if the balance of rewards over costs is thought to be above that likely to be obtained in any alternative relationships available, taking into account the costs of the transfer. Costs and rewards are defined in terms of exchange of material and immaterial goods, such as emotional and instrumental support, compliments, advice, care, presents, etc. People tend to evaluate their relationships and their alternative relationships in terms of costs, rewards, and investments, and consequently choose to start, to maintain or to dissolve relationships.

The similarity hypothesis as well as the reciprocity mechanism can be explained from the perspective of the social exchange theory. People have a tendency to reward those who reward them, to like those who like them, and to become friends with those whom they consider think of them as friends. The reciprocity mechanism has been confirmed in many studies (e.g. Curtis & Miller, 1986). It has been concluded that one of the most important factors influencing the tendency to like or dislike another person, is the information whether that person likes us or not. We tend to like those people whom we think like us (Aronson, 1995).

A close relationship between people is often defined in terms of a connection involving strong and frequent interdependence in many areas of life. The concept of interdependence, introduced by Kelly, means that "each partner's thoughts, emotions, and behaviours influence the other's" (Smith & Mackie, 2000, p. 431). There are three kinds of interdependence: cognitive, behavioural and affective (Smith & Mackie, 2000) – all of them are necessary for the development of deep, emotional relationships. Cognitive interdependence can be defined as thinking about the self and

partner as inextricably linked parts of a whole – a relationship – rather than as separate individuals (Agnew, Van Lange, Rusbult, & Langston, 1998). As the relationship develops, it is characterised by intense and frequent interactions, during which partners learn a lot about each other. It was stated by Smith and Mackie (2000) that "as the typical differences between the cognitive representations of the self and the partner are reduced or eliminated, knowledge of the partner becomes more like self-knowledge" (p. 433). Then "mental representation of the self and partner are linked into a single unit" (p. 433), which is a defining feature of cognitive interdependence. Cognitive interdependence is connected with feelings of intimacy and to the relationship's stability over time (Aron, Aron, & Smollan, 1992).

Behavioural interdependence means that partners have great influence on each other decisions, activities and plans – their lives are interlinked. Partners spend a lot of time together and share a number of different activities. According to Smith and Mackie (2000) "the extent of behavioural interdependence is a strong predictor of how long the relationship will last, even stronger than the couple's positive feelings for each other" (p. 432). Behavioural interdependence was demonstrated in the study by Aron, Aron, Tudor and Nelson (1991) in which participants divided up a set amount of money between themselves and another person. The results of the study showed that people gave themselves much more than they gave to a stranger, but they gave the friend just about the same amount as they gave themselves. Moreover, people wanted to benefit their friend even if he or she did not know from whom the money was. The results of this research show that people were as generous to a close friend as to themselves.

Affective interdependence can be defined as "the affective bond that links close relationship partners" (Smith & Mackie, 2000, p. 432). It means that "each partner's emotional well-being is deeply affected by what the other does" (Smith & Mackie, 2000, p. 432). The affective interdependence is characterised by deep intimacy and commitment. "Just as closeness transforms the exchange of rewards and the way partners think about themselves and each other, it also fundamentally changes the

partners' feelings. A sense of intimacy grows, and the partners' commitment to the relationship deepens" (Smith & Mackie, 2000, p. 436).

Intimacy is one of the most important concepts in close relationships. It is defined as a positive emotional bond that includes understanding and support (Reis & Patrick, 1996). According to Reis and Patrick, feelings of warmth, connectedness, and caring are so important to people that psychological intimacy is the most central reward of a close relationship.

Commitment, a concept from the investment model of relationship, is considered to be as important in any close relationship as intimacy. Intimacy may draw people closer, but it is commitment that holds a relationship together. The investment model of relationship is an elaboration of the social interdependence theory. According to that model, as mentioned above, commitment is the most important factor contributing to relationship development, leading to stability in the relationship, willingness to accommodate and to sacrifice. Commitment is one's long-term orientation towards one's relationships; "it incorporates feeling attached to a partner and wanting to maintain the relationships in the future" (Tesser, 1995, p. 310). It can be defined as "the combined forces that hold the partners together in an enduring relationship" (Smith & Mackie, 2000, p. 438). According to Rusbult (1983), commitment is the central force that keeps people working to promote and maintain their relationship. There are many factors which contribute to one's sense of commitment to a relationship. The most important are satisfaction and investment in the relationship as well as the comparison level with alternative relationships (Tesser, 1995). Satisfaction with the relationship refers to the recognition of the rewards it brings, such as the opportunity to make intimate self-disclosures, express sexuality, experience emotional involvement, find companionship for enjoyable activities, and feel secure, worthy, and validated (Drigotas & Rusbult, 1992). People tend to evaluate those outcomes by comparing them with the outcomes they would receive in alternative relationships. Commitment usually increases as the relationship develops. "As the partners' intimacy increases, they are likely to derive increasing satisfaction from the relationship, and

they begin to perceive alternative relationships as less desirable and less available" (Smith & Mackie, 2000, p. 438).

Both the interdependence theory and the investment model (Rusbult, 1983) contribute to the understanding of the process of relationship development. Thibaut and Kelly (1959, as cited in Bunt, 1999) introduced the concept of "social interdependence". They claim that an individual in a relationship not only tends to maximise his or her outcomes, but also takes into consideration the consequences for his or her partner, because otherwise the partner may terminate the relationship. They also introduce the concept of a "comparison level" which means that people have the tendency to evaluate the outcomes (costs and rewards) from their relationships relative to the outcomes they feel they deserve. If the partner perceives that another person may provide him or her with a larger outcome, he or she may terminate the relationship and start a new one.

Another very interesting theory of interpersonal processes is a theory of self-esteem maintenance in the context of relationships – self-evaluation maintenance (SEM) theory (Tesser & Campbell, 1980, as cited in Tesser, 1995). People like to have a good opinion about themselves (high self-esteem) and tend to like those who have the ability to contribute to that opinion. Supporting the self-esteem of the partner serves as a reward; therefore people prefer relationships with those partners who do so. One's relationships with others can influence one's self-esteem through two interpersonal processes - reflection and comparison. The reflection process raises self-esteem by allowing one partner to bask in the other's glory. Through comparison processes one's self-esteem may be raised by another person's poor performance because the other's poor performance makes one's own performance look better by comparison. The key determinant of which process will apply is the relevance of the performance domain to the person in question (Tesser, 1995)

To this point it has been said that as a relationship develops, the partners exchange rewards. Many different things can be regarded as rewards - one of them is self-disclosure. According to Smith and Mickie (2000) "relationship development also includes exchanges of self-disclosures as the partners come to know each other better. Self-disclosures increase liking and offer opportunities for sympathetic, supportive responses" (p. 429). Liking another person is a result of having disclosed oneself to the person, almost independent of that person's reaction to the disclosure. As Altman and Taylor (1973) stated, "revealing leads to liking and liking leads to revealing, as a cyclical and continuous set of events" (p. 50). Both the depth of self-disclosures (the level of intimacy of the information) and the breadth (the range of topics) increase as the relationship develops (Altman & Taylor, 1973). According to Morton (1978) self-disclosure includes facts about one's life and situation but also encompasses inner thoughts, feelings and emotions. Research supports the idea that disclosing something about oneself makes both strangers and friends like one more (Collins & Miller, 1994).

According to Smith and Mackie (2000), as partners interact over time, they exchange rewards, they feel good about themselves and each other, they share intimate information, grow in mutual understanding, demonstrate trust and obtain support and self-validation. The partner's liking depends on the way the exchanges of rewards and self-disclosures operate in the relationship. "If the process continues smoothly, casual friendship may be transformed into a close relationship" (Smith & Mackie, 2000, p. 430).

A very popular model for understanding the development of relationships is Knapp's Relational Stages Model (Relationship, n.d.). Knapp's model works well to describe many types of relationships: romantic couples, friends, business partners, room-mates, etc. It describes the development of relationships throughout five stages.

Initiation is a very short stage (about 10-15 seconds) during which interactants are concerned with making favourable impressions on each other. They may use standard greetings or observe each other's appearance or mannerisms.

In the next stage, called experimenting, individuals ask questions of each other in order to continue the relationship. This is the last stage for many relationships.

The intensifying stage is characterised by self-disclosure. The relationship becomes less formal, the interactants begin to see each other as individuals, and statements are made about the level of commitment each has to the relationship.

During the integrating stage the individuals become a pair. They begin to do things together and others come to see them as a pair. "A shared relational identity starts to form in this stage" (Relationship, para. 5).

In the last stage of the relationship escalation, called the bonding stage, a formal announcement of the relationship is made, for example, marriage, best friends, or a business partnership agreement. Few relationships reach this level.

Duck's Relationship Filtering Model (Relationship, n.d.) is another way of looking at how relationships begin and develop. Duck's model is a set of filters through which we make choices about the level of relationship we wish to pursue with others. The first filter, sociological/incidental cues, describes the constraints placed on our meeting people, owing to where we live or work. In other words, given our sociological location, there are some people we see a lot of and others we never meet.

During the next stage, called pre-interaction cues, individuals decide, taking into account the information they have about people, whether they wish to have a relationship with a particular person. Information about the person, such as his or her occupation, may lead us to decide whether to begin the relationship.

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During the interaction cues stage, the individuals begin to interact with each other. They make judgments about whether to progress or terminate the relationship with a particular person.

At the deepest level, called cognitive cues, the participants of the interaction make judgments about each other based on their personality and the degree to which they think it matches theirs. If a relationship reaches this level, its participants can be called, for example, best friends.

1.3. On-line friendship

The theoretical background concerning development of personal relationships has been presented so far. Now the question is, whether those theories and models can be applied to on-line relationships. Lea and Spears (1995) note that the study of on-line relationships throws up various challenges that are not easily met by the addition of some simple contingence to current social psychological models of relationship processes. The problem is that those studies focus on direct face to face interaction as the primary vehicle for relationship formation. In a virtual world the situation is different – many of the qualities, which according to those theories are essential for development of relationships, are absent or severely limited. For example, measures of interpersonal attraction include some aspects that do not come into play in CMC, nor can they be measured, such as eye-contact, body language, inclination to one another (leaning towards each other) or the distance one stands away from another person. There is usually no information about physical appearance in a virtual world, that would normally be used to draw inferences about others' sociability and personality and specifically to make choices about dating partners (Berscheid, 1985).

Scientists pose several challenges regarding on-line relationships. The most important is lack of both physical appearance and frequent face to face interactions (Kelley,

1979). According to Lea and Spears (1995) physical proximity, face to face interaction, information about physical appearance, cues about group membership, information about broader social context and nonverbal communication are prerequisites for relationship development. Such factors are very limited in on-line relationships and therefore it can be supposed that this may hinder the development of deep personal relationships.

On the other hand, Wellman and Gulia (1997) have noted that there are many superficial real world social interactions and that we often over-idealize those relationships. Many researchers make the mistaken assumption that face to face relationships are inherently superior to on-line relationships.

However, other social researchers wonder whether contextual, visual, and aural cues are really necessary for the development of relationships. According to exchange based theories the cost-reward ratio is the driving force (Kelley, 1979). Cues connected with the physical world, for example physical appearance, are not the only source of rewards: another, for example, could be the systematic interaction with the partner.

In summary, according to some researchers there are features of the virtual world which can inhibit the development of personal relationships, but on the other hand some very important aspects of the on-line world can support the process of relationship formation. Therefore, conflicting predictions regarding the formation and maintenance of on-line relationships can be obtained from different research.

As "the Internet is the virtual world that is the same in some ways but different in others from the one traditionally studied" (McKenna & Bargh, 2000, How is the Internet different, para. 1), researchers should take into consideration those differences between on-line and off-line realities that may have essential consequences for the formation of personal relationships.

According to Kiesler, Siegel and McGuire (1984) CMC is characterised by dramaturgic poverty, social anonymity, not enough information about the social status of the participants and lack of regular feedback.

John Suler (1996), in his article "The basic psychological features of cyberspace", summarized the differences between the virtual and off-line world. He named "the unique features of cyberspace that fundamentally shape the user's psychological experience of this new social realm" (para. 1). These are:

- limited sensory experience: for most part people communicate through the written word. In the virtual world it is impossible to physically interact with each other: no handshakes, hugs, kisses;

- identity flexibility and anonymity: "Communicating only with typed text, you have the option of being yourself, expressing only parts of your identity, assuming imaginative identities, or remaining completely anonymous" (Suler, 1996, para. 3) – cyberspace gives one the opportunity to engage in greater identity and role construction than is possible in an off-line world. According to Turkle (1995, as cited in McKenna & Bargh, 2000) "the Internet offers an alternative playground for testing our personality and identity aspects with no fallout for the individual" (Role identity, para. 4). As McKenna and Bargh (2000) have stated, anonymity can have positive as well as negative effects. The researchers have found that anonymity facilitates negative behaviours, such as hostility or aggressive responses – "people tend to behave more bluntly when communicating by e-mail or participating in other electronic venues such as news groups, than they would in a face to face situation" (McKenna & Bargh, 2000, Deindividuation, para. 3). On the other hand anonymity makes it easier for people to be open and honest about personal issues than in a face to face encounter. In a study by Gergen, Gergen and Barton (1973) individuals who met and talked without seeing each other disclosed much more of their personal issues than those who met and talked

while seeing each other. As Spears and Lea (1994) observed anonymity "allows one to express one's true mind, or authentic self, unfettered by concerns of self-presentation, or even physical sanction" (The Equalisation Phenomenon: A Panacea for Problems of Status?, para. 3).

- equalisation of status: in a virtual world it is one's skill in communicating (mostly writing skills), one's persistence, the quality of one's ideas and also the technical know-how that determines one's influence on others;

- transcending spatial boundaries: in cyberspace geographical distance does not matter, and this has important implications for people with unique interests;

- time stretching and condensation: on the Internet people have more time to compose a reply. " Cyberspace creates a unique temporal space where the ongoing, interactive time together stretches out. This provides a convenient zone for reflection" (Suler, 1996, para. 6);

- access to numerous relationships: Internet users can communicate with hundreds, even thousands of people;

- permanent records: The Internet users can keep records of their interactions. "You can re-experience and re-evaluate any portion of the relationship you wish. You can use quoted text as feedback to the partner" (Suler, 1996, para. 8);

- altered and dream states: "Sitting quietly and staring at the computer monitor can become an altered state of consciousness. While reading e-mail or text talk in chat rooms, some people experience a blending of their mind with that of the other person" (Suler, 1996, para. 9);

- black hole experience: There are moments when computers or the Internet fail to work. Our reactions – frustration, anger, anxiety – are called by Suler (1996) the black hole experiences of cyberspace.

McKenna and Bargh (2000) point out four major differences between the virtual world and real world interactions that can be considered as most important: "one's greater anonymity, the greatly reduced importance of physical appearance and physical distance as gating features to relationships development, and one's greater control over

time and pace of interactions" (para. 1). These characteristics can have very important consequences for on-line interactions, especially because from research about real life interaction we know that they are major determinants of whom one will meet and form relationships with. Therefore the absence of physical attractiveness and physical proximity, as well as greater anonymity and greater control over time on the Internet, should alter the course of interaction and relationship formation.

On the Internet, one cannot see the physical attractiveness of the partner; therefore liking, attraction and friendships must be based on different grounds, such as similarity of values and interests or proximity (defined in the next paragraph) as these are also powerful determinants of friendship and attraction. According to McKenna and Bargh (2000) "the Internet may foster the formation of relationships that never would have begun in real life. In fact, relationships formed at these deeper levels may be more durable and important to the individual than those based on more superficial physical features" (Turning the tables on attraction, para. 2). The virtual world gives people the opportunity to meet without the influence of stereotypes based on physical attractiveness. McKenna, Green and Gleason (2002) in their article "Relationship formation on the Internet: what's the big attraction?" described the special qualities of Internet communication. According to them, as well as to others, there are no usual "gating features", such as physical appearance or visible shyness, to the establishment of any close relationship on the Internet. "Those gates often prevent people who are less physically attractive or socially skilled from developing relationships. On the Internet such features are not initially in evidence and thus do not stop potential relationships from getting off the ground" (McKenna, et al., 2002, Getting Past the Gates, para. 1). The results of their laboratory experiment "Friendship formation in the absence of traditional 'gating features'" confirmed their prediction. They hypothesised that those who meet for the first time on the Internet would like each other better than those who meet face to face. Moreover, the liking for the partner would be greater in the Internet group even after a face to face meeting. Thirty one male and thirty one female students engaged in two 20-minute meetings. They were randomly assigned to one of the following three conditions. In a control condition, participants met face to

face both times. In the Internet Relay Chat condition, partners met on the Internet and then met face to face. For both the control and Internet Relay Chat conditions, participants knew that they were meeting the same person both times. "In the final, 'trading places' condition, the participant interacted with one partner in person and also with a person he or she believed was a different partner over the Internet. In reality, it was the same person both times, though neither partner was aware of this" (McKenna, et al., 2002, Study 3, para. 4). The results confirmed the initial predictions. The same person was liked more when he or she interacted with a partner via the Internet than when partners met face to face. For those who met on the Internet, liking increased after meeting face to face, but for the control condition group liking decreased, albeit non-significantly, after the second meeting. As far as the quality of conversation was concerned, participants in the Internet Relay Chat conditions were more likely to tell their partners what they specifically liked about them, compared to participants in the control conditions. Participants also felt they knew their Internet Relay Chat partner better than their face to face partner. The analysis of the data showed that when people interact on the Internet, the quality of interaction, especially the intimacy and closeness, determined the liking. "In the face to face meetings, the quality of the interaction did not matter to liking judgements, consistent with the notion that in face to face interaction it is the more superficial gating features that dominate liking and overwhelm other interpersonally important factors" (McKeena, et al., 2002, Study 3, para. 17).

Research results have demonstrated that in the real world, proximity and repeated exposure are factors which influence the decision whether some people become friends or romantic partners. Although in the virtual world one cannot see others' physical presence, the Internet users become familiar with each other through nicknames, e-mail addresses or character names. In the virtual world, proximity can be understood as "frequency of crossing the Internet ways" (Wallace, 2001, p. 185). According to Wallace (2001), if two Internet users often see each other's names in the same discussion groups, write to the same mailing lists or play the same MUDs (at the same time), their Internet ways often cross, and therefore they are more likely to

become friends. Parks and Floyd (1996) found that the possibility of finding on-line friends increases as the frequency of posting messages to the newsgroups increases. Although those who formed on-line relationships did not differ from those who did not, in terms of how frequently they read their favourite newsgroups, they did differ in terms of how often they posted messages to their favourite newsgroups. "Those with on-line relationships contributed more often (M=4,01; SD=1,81) than those without (M=3,09; SD=1,54)" (Parks & Floyd, 1996, Who Has On-line Personal Relationships?, para. 4).

It has been shown that the anticipation of future interactions influences the process of making friends in non-Internet life (Kellermann & Reynolds, 1990). If communicators accept that they may meet in future they tend to "seek more information about one another, to act more friendly, and to cooperate in negotiations – in essence, to enact more relationally positive communication" (Walther, 1996, Investigations, para. 3). Walther (1994) found that the same relation was present during CMC encounters. In his study, subjects were assigned to groups, which met either face to face or using CMC. Participants were told that they would be working on three tasks. Half of the groups were led to expect that they would work with the same people on all three tasks, whereas the other half were told they would work with different partners each time. After one task, all participants were asked to fill in the questionnaire concerning their opinion about members of their group. After that, they were informed that it was the end of the experiment. It was observed, that those people who had expected that they would be working with the same people on all three tasks evaluated their partners more positively than those who had not expected future interaction. Moreover, people who believed that they would work together for some weeks showed each other more emotions during communication, were more open, as well as being friendlier and nicer to each other. "After one task, results showed that the assignment of long-term versus short-term partnerships made a larger difference to computer conferencing partners than it did to face to face partners on the degree of anticipated future interaction they experienced" (Walther, 1996, Investigations, para. 3).

Not only physical attractiveness and proximity are important factors in the process of relationship formation and development. As was already mentioned above, research has also shown that we are more likely to be attracted to those who are similar to us and who share our opinions. In a virtual world, "the unique structure of newsgroups and Internet relay chat allows individuals to easily find others who share highly specialized interests. There may be, for example, 50 000 people in the world who share one's special passion, but these people are scattered across all five continents and dispersed among over 5 billion human beings. The Internet enables all of them (who have connection to the Internet) to come together in the same virtual space, transcending the problems of physical distance and wide dispersion, and of finding each other. Especially in more rural areas, if it were not for the Internet many people would never have the opportunity to share these important interests and passions with another person" (McKenna & Bargh, 2000, The Shared Virtual Space of the Internet, para. 4). In a virtual world, people do not have to spend much time recognizing if they have some interest in common. Maybe this is because chat rooms and newsgroups are more personalised (e.g. the "golf room") and so you come into the room already knowing you have something in common with other participants.

McKenna, Green and Gleason (2002) described special qualities of Internet communication. Beside the lack of the usual obstacles or "gates" that inhibit the development of relationships in non-Internet settings, such as physical attractiveness, they also distinguished:

- the greater anonymity of the CMC, which produces greater intimacy and closeness and reduces the risks of disclosure, especially about intimate aspects of the self;
- the ease of finding other similar people on the Internet.

They conclude that "it should be the case that relationships will develop closeness and intimacy significantly faster over the Internet than will relationships begun off-line because of the greater ease of self-disclosure, as well as the founding of the

relationship on more substantive bases, such as shared interests (as opposed to physical attractiveness alone)" (McKenna, et al., 2002, Implications of the Distinct Qualities for Relationship Formation, para. 1).

The differences between the on-line and off-line worlds, which may have an impact on interpersonal communication as well as on relationship formation and development, have been described so far. Researchers agree that CMC and virtual reality influence the manner in which individuals relate and behave. Some researchers concentrate on the characteristics of the virtual world that inhibit the formation and development of personal relationships, such as absence of physical contact, while others notice the positive aspects of CMC, such as anonymity or the limited role of physical attractiveness. It is worth noticing that a few different kinds of on-line and off-line relationships can be distinguished. Between purely on-line and purely off-line relationships, there is a wide range of relationships which exist in both realities. For example, people can meet on-line and after some time start meeting only off-line, or on the contrary, when one of the partners migrates to a different country relationships can move from off-line reality to on-line. In addition, people can meet in both realities: for example, they may most often meet on-line (off-line) and sometimes off-line (on-line). It is possible that such relationships can enjoy the advantages of both realities and therefore reach the highest levels of development.

On one side we have friendship – deep, personal relationship – on the other there is the Internet and CMC, the world wide web connecting computers and giving people the possibility of communication. The question is, whether it is possible to form and maintain such a deep, emotional, personal relation between people in a virtual world which has been described by some scholars as "a dangerous conveyor of pornography to the unwitting eyes of children, or as causing Internet addiction" (McKenna & Bargh, 2000, Fear and loathing of the Internet, para. 1).

It therefore appears important to investigate whether the Internet can help us to develop long-lasting, emotional, deep personal relationships or on the contrary, whether only the illusion of friendship can be found in the virtual world.

The following questions will be investigated in this research:

- How prevalent are on-line friendships among young Internet users?
- Are there differences in quality between on-line and face to face friendships?
- What kinds of individual differences (psychological, social, demographic) relate to looking for on-line friendships?
- What factors differentiate people who have started friendships on-line from those who have not?
- What factors are important for the development of on-line friendships?

The more we learn about this new medium of communication, the more we may be able to avoid its negative consequences. While it may be impossible to stop the development of the technology, we will have to learn how to live in the modern world and how to use the fruits of technology wisely.

Chapter 2
Literature Review

2.1. The prevalence and the quality of on-line friendships

2.1.1. On-line friendships - is it possible?

Is it possible to make friends in cyberspace? How often are personal relationships formed on-line? Wellman and Gulia (1997) as well as many other scholars ask precisely this question: "to what extent are strong, intimate relationships possible on the Net?" (p. 4).

There is a debate concerning the value of the CMC and the Internet for social relationships. To this point we have learnt that CMC blurs the traditional boundaries between interpersonal and mass communication phenomena, and raises new opportunities and risks for the way individuals relate to one another (Lea & Spears, 1995). Some of the scholars pay attention to the risks, others to the opportunities connected with Internet use and formation of relationships on-line. The first group argues that only the illusion of community can be created in cyberspace (Hart, 1996; Kraut, Patterson, Lundmark, Kiesler, Mukophadhyay, & Scherlis, 1998). The Internet is causing people to become socially isolated and alone because on-line relationships are casual, shallow, temporary and impersonal.

Enthusiasts, on the other hand, see on-line relationships as "freeing people from the constraints of geography and isolation brought on by stigma, illness, or schedule" (Kraut et al., 1998, para. 1). According to supporters of this view, the Internet creates opportunities for people to find each other, to develop deep, emotional relations. Since people are no longer limited by physical proximity, time and space, they can look for friends all over the world.

The research results also show two different views about developing and sustaining personal relationships in a virtual world. On the one side, there is evidence showing that deep and meaningful social relationships are possible on-line (e.g. Shapiro, 1999; Parks & Floyd, 1996).

Parks and Floyd (1996) and others (for example, McKenna, et al., 2002; Parks & Roberts, 1998) have observed a high degree of socio-emotional content in CMC, and they have found many examples of friendship in a virtual world.

Sixty percent of the subjects in the study carried out by Knox, Daniels, Sturdivant, Zusman and Cassel (2001) reported that they had met someone on-line. About a quarter of those developed into friendships. According to Schnarch (1997) on-line interaction promotes a high degree of self-presentation and makes it easier for a person to take small steps in relationships. McKenna et al. (2002) argue that on-line communications occur in a context which makes it easier and quicker for people to get to know each other. Lea and Spears (1995) stated that although information is transmitted at a slower rate through CMC, self-disclosure, development of trust, and communication of intimacy are possible on-line. The fact that the people have not met face to face does not necessarily seem to mean that the relationships are any less "real" or significant for those involved. Walther (1996) describe empathy, feelings of commitment and friendships in groups communicating via CMC. On-line relationships are genuine personal relationships in the eyes of the participants, and some people even report that they are much deeper and of a better quality than real-life friendships (Bruckman, 1996).

On the other hand, there are research findings showing that on-line relationships are shallow, meaningless and temporary. Only a few participants in Kraut et al.'s study (1998) met new friends on-line. According to them, "on-line friendships are likely to be more limited than friendships supported by physical proximity" (Kraut et al., 1998, Displacing strong ties, para. 2). Parks and Roberts (1998) found that on-line

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relationships are characterized by less interdependence, understanding, and commitment than comparable off-line ones are. Cornwell and Lundgren (2001) compared real space and cyberspace relationships and found that, "involvement, particularly commitment and seriousness - tended to be lower in cyberspace than in real space relationships" (p. 197). Many researchers are wondering if it will ever be possible to reduce uncertainty about on-line partners. Clifford Stoll in an interview (Hart, 1996) argues that the nature of CMC makes it easy to display to other people only those qualities which one wishes to show. According to him e-mail communication denies the sense of who you are and where you are and leaves out the most important things about you.

Theories of interpersonal communication and relationships development supply us with conflicting predictions as well. The question is whether CMC is appropriate and effective for exchanges of interpersonal information or whether it is only useful for impersonal communication. In the words of Liu's abstract (2002) - is CMC "task-oriented, social-emotional-oriented, or both?".

From the large body of research contradictory pictures of the nature of CMC emerge. Most of the early research on computer-mediated communication (prior to the 1990's, e.g. Connolly, Jessup, & Valacich, 1990; Hiltz, Johnson, & Turoff, 1986; Kiesler et al., 1984) focused on task-oriented communication. Numerous studies mostly involved laboratory experiments in which small groups worked on structured problems for fixed periods of time. Group members were randomly assigned, therefore, typically new to each other (zero-history groups). Such research indicates that CMC was experienced as more businesslike, depersonalized, and task-oriented. CMC scored significantly lower than face to face communication on certain social categories of conversation. For example, groups communicating by CMC had greater difficulty recognizing and moving towards shared points of view (Hiltz, et al., 1986). Moreover, "CMC was significantly higher than FtF on certain types of hostile or profane speech acts, leading to characterisation of CMC as uninhibited and depersonalized" (Walther, 1996, para 6). For example, people in computer-mediated groups use more verbal

aggression, blunt disclosure, and nonconforming behaviour than people in face to face groups (Dubrovsky, Kiesler, & Sethna, 1991; Walther, 1994).

A comprehensive summary of the major findings resulting from the Task-Oriented Model of CMC can be found in a review article by Liu (2002). According to that model, computer-mediated communication is characterised by:

- equal participation: it was found that status and expertise inequalities in participation were reduced in CMC discussions (Dubrovsky, et al., 1991);
- uninhibited behaviour: Siegel, Dubrovsky, Kiesler, & McGuire (1986) and Kiesler et al., (1984) reported that CMC group members exhibited more uninhibited behaviour than face to face group members;
- the fact that the decisions reached are of a higher quality: "Gale, Dotson, Huber, Nagireddy, Manders, Young, & Carter, (1995) found that the group support systems in CMC environments can improve brainstorming" (Liu, 2002, Major Findings, para. 4). It was also found by Hallingshead (1996) that equal status groups made better decisions than mixed-status groups;
- increased time to reach a decision: many researchers (Hiltz et al., 1986; Siegel et al., 1986) agree that it is easier and it takes less time to reach an agreement during face to face discussion than during CMC discussion;
- depersonalisation: "Kiesler et al., (1985) reported that they could not find any influence of CMC environments on physiological arousal, nor on emotions or self-evaluations. From the perspective of Kiesler et al. (1985), CMC environments were impersonal" (Liu, 2002, Major Findings, para. 6).

Findings from the Task-Oriented Model perspective of CMC have generally emphasized the social disadvantages of CMC, therefore implying that highly developed, positive personal relationships will occur infrequently in a virtual world. For example, perceptual research by Rice (1993) revealed ratings of CMC as less suitable for personal interactions than multichannel media. Another example of such an evaluation of CMC can be found in the results of research carried out by

Cummings, Butler and Kraut (2002). They asked employees of a bank and students to evaluate the usefulness of the Internet, telephone, and face to face communication for developing and maintaining social ties as well as for getting work done. In the first study, 979 employees of a multi-national bank rated communication by e-mail to be reliably worse than communication by telephone or face to face, both for maintaining work relationships and for getting work done.

To counter the objection that personal relationships are not central to work activity, the authors decided to replicate the original study among university students (Cummings et al., 2002). These students used e-mail very often (a mean of 11 messages per day) and were in a life-stage during which the development of personal relationships is very important. The 39 students were asked to complete a diary, in which they reported information about communication episodes they participated in as well as about their usefulness for getting work done, exchanging information and developing or sustaining personal relationships. Among other information, students recorded their relationship with their communication partner (relative, friend, acquaintance, or other), the duration of the communication, the topic of communication (schoolwork, personal, the other), the modality over which it occurred, i.e. face to face, over the telephone or over electronic mail. Respondents evaluated communication via the Internet as being worse for sustaining personal relationships than face to face communication and telephone conversation. The students considered e-mail to be as good as the telephone and face to face communication for getting work done, and even better than telephone and face to face conversation for exchange of information.

The two other variables, namely the frequency of communication with each partner as well as the strength of relationship, were also estimated. The frequency of communication over the different modalities (face to face, telephone and e-mail) was significantly related to the strength of the relationship. However, face to face communication and telephone conversation were both significantly better predictors of the strength of a relationship than communication via the Internet. From the research

findings described above, the conclusion can be drawn that CMC is a better tool for tasks (such as schoolwork) than for maintaining social relationships.

Theoretical models that emerged to explain these research results (Social Presence Theory, Media/Information Richness Theory, and Social Context Cues Theory) contended that impersonality was an effect of the lack of nonverbal cues such as vocal qualities, bodily movement, facial expressions or physical appearance, that are filtered out in on-line settings. "The absence of those capacities, which convey personal and emotional information in face to face conversation, was said to affect users' interpersonal impression formation and their perception of the communication context, and to constrain users' selection and interpretation of messages" (Walther, 1996, Why might CMC be inherently impersonal?, para. 1). Those observations, which are known as a "cues-filtered-out" perspective, form the core of three theories: Social Presence Theory, Media/Information Richness Theory and Social Context Cues Theory.

The first model, developed by Short, Williams and Christie (1979, as cited in Liu, 2002), known as the Social Presence Model, concentrates on the reduction of contextual, visual, and aural cues in CMC (vocal qualities, facial expressions, physical appearance). It is argued that this reduction in relational cues emanating from the physical context makes it very difficult to build relationships on-line. According to Short et al., the fewer channels a medium has, the lower its social presence is. Social presence is a "quality of the medium itself", and is the extent to which a medium is perceived as conveying the actual physical presence of the communicators. "Thus, social presence not only depends on the communication of words, but also on a variety of nonverbal cues such as physical distances, postures, facial expressions, and the like" (Liu, 2002, The task-oriented model, para. 2). According to this theory, the perception of the communication partner is very impersonal in those media with low social presence; thus communication is seen as task-oriented and perceived as cold and unemotional rather than warm and sociable. An on-line conversation was compared to a conversation in a "social vacuum".

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The absence of social and contextual cues is also the central factor of the Social Context Cues theory (Kiesler et al., 1984; McGuire, Kiesler, & Siegel, 1987). According to them, CMC reduces "social context cues". These "social context cues" are aspects of the physical environment and nonverbal hierarchical status cues, such as the perception of leadership, status and power, the absence of which undermines the process of impression formation and relationships development. In the words of Kiesler (1986) "without nonverbal tools, a sender cannot easily alter the mood of a message, communicate a sense of individuality, or exercise dominance or charisma" (p. 48). Moreover, the absence of social and contextual cues leads to difficulties in coordination, deindividualisation (which means a loss of identity, reduced self-regulation, and self-awareness), and equality of participation (Spears & Lea, 1992). According to both the theories mentioned above, on-line personal relationships should occur infrequently.

A similar conclusion was reached by Draft and Lengel (1984) in their Media Richness model. The theory states that media can be ranked according to their richness. "A medium is regarded as rich if it facilitates feedback, communicates multiple cues, presents individually tailored messages and uses natural language" (Utz, 2000, Research on computer-mediated communication, para. 15). CMC is a very lean channel, because there are no non-verbal cues. CMC falls between face to face communication and formal numeric text in terms of richness. For different kinds of message, different kinds of communication media should be used; for example, CMC is useful when messages are very simple or unequivocal. However, in order to understand more ambiguous or emotional information, a richer medium should be used. From this point of view, CMC is less socially oriented and less personal than face to face communication. As already mentioned, there is a large number of research findings that support these ideas. They describe CMC as impersonal, hostile and tasks-oriented (e.g. Kiesler et al., 1984).

However, a totally different picture of CMC has emerged from fields studies, where interaction time was not constrained. This research has shown that CMC can be very rich in socio-emotional content (Rice & Love, 1987). Growing numbers of reports have appeared that show more personal CMC interactions than in face to face conditions (Walther, 1996). For example, McCormick and McCormick (1992) found a surprisingly high amount of "highly intimate content" in their study of e-mail communication. Many Internet users develop friendship in asynchronous Usenet newsgroups (Parks & Floyd, 1996), in Multi-User dimensions, Object Oriented (Parks & Roberts, 1998), and in real-time Internet Relay Chat (Reid, 1991). A great deal of social interaction has been found in the realm of managerial communication (Markus, 1994), in some computer conferences and in bulletin board systems (Walther, Anderson, & Park, 1994). The interpersonal side of CMC has emerged from the studies of e-mail in the workplace, where people use e-mails to socialise, maintain relationships, play games, and receive emotional support (Feldman, 1987, as cited in Parks & Floyd, 1996).

An explanation for these discrepancies between laboratory and field studies has been proposed by Walther (1992). He observed that many of the differences between CMC and face to face interaction diminished over time. As he demonstrated, it takes longer to type than to speak, and people have to get used to the new medium, therefore the impression development process takes longer in CMC. If there is sufficient time, the differences between CMC and face to face communication diminish. The model developed by Walther (1992) as an alternative to the cues-filtered approach, which explains the differences between research results, is known as the Social Information Processing model (SIP model). This model assumes that CMC participants, like other communicators, are motivated to develop social relationships. In the virtual world, however, only textually conveyed information is used to form simple impressions about other communicators. "Based on these impressions, they test their assumptions about others over time through knowledge-generating strategies, the results of which accumulate in refined interpersonal knowledge and stimulate changes in relational communication among CMC users. Rather than the fixed relational qualities imputed

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to CMC in previous theories, the social information processing model predicts normal but temporally retarded interpersonal development" (Walther, 1996, A social information processing perspective, para. 1). Because of the absence of nonverbal cues in CMC messages, less social information is conveyed in a CMC message than in a face to face message. Although all social and instrumental information is travelling through one code system - "a system in which even verbal messages travel slower than they do in oral speech" (Walther, 1996, A social information processing perspective, para. 2), the model also assumes that CMC user learn to adapt their verbal behaviour to the restrictions of the textual medium as the sole channel for relational communication. According to this model, both CMC and face to face communication provide the opportunity for message exchange and accompanying relational development but it takes more time in the virtual world to exchange the same amount of social information. During CMC "accrual of interpersonal effects is expected to be slower in time and develop in proportion to the accumulation of message exchanges" (Walther 1996, A social information processing perspective, para. 2).

The SIP model has been confirmed in several studies (Walther, 1993, 1995). Some results were surprising because CMC groups were rated even more positively than face to face groups on several dimensions of intimacy (Walther, 1994). For example, it was found that more personal questions and self-disclosures were exchanged during on-line encounters than face to face ones. At first there was not theoretical explanation for such a hyper-personal tone in the CMC groups. After some time, however, certain approaches began to shed light on these phenomena.

The hyper-personal perspective was proposed to explain "the ways CMC users sometimes experience intimacy, affection, and interpersonal assessments of their partners that exceed those occurring in parallel face to face activities of alternative CMC contexts" (Walther, Slovacek, & Tidwell, 2001, The Hyperpersonal Communication Framework, para. 1). According to this perspective, the sender, receiver, channel, and feedback all contribute to hyper-personal interaction in CMC. As far as the sender is concerned, CMC offers the opportunity for "selective

self-presentation". "Users may modify their texts using CMC's affordances to inspect, edit, and revise messages before they are sent (a luxury that is rare in face to face interaction). In addition, in CMC there is no accidental transmission of unintended nonverbal behavior or physical appearance uses" (Walther et al., 2001, Senders, para 1). Two elements of CMC, namely reduced communication cues and potentially asynchronous communication, may provide an on-line sender with this opportunity to modify their self-presentation (Walther & Burgoon, 1992). Research (Ekman & Friesen, 1969, as cited in Walther, 1996) also shows that it is easier to control verbal than non-verbal behaviours. As the social information is conveyed in CMC primarily through language (verbal cues), it is thus more selective, malleable and subject to self-censorship than in face to face interaction. This means that "the first impressions are highly manageable in a CMC, and such social valuations as one is able to garner are not impeded by messy hair, lack of make up, or normal imperfections" (Walther, 1996, Reduced Cues, para. 1). People tend to evaluate their on-line communication partners more positively than their face to face communication partners. Chilcoat and DeWine (1985) found that when participants in their experiments could not see each other, they thought that their partners were more attractive than in reality. Partners involved in audio conferencing evaluated the attitudes of their fellow participants in a similar way, rating social and physical attractiveness more positively than those persons using video or face to face contact.

"Another beneficiary of the lack of physical cues for the CMC sender may be in increased cognitive resources devoted to message construction" (Walther, 1996, Cognitive reallocation, para. 1). According to Walther (1996) CMC communicators can devote more time to language selection than face to face communicators and therefore they may express themselves in ways more revealing of their self-perceptions, or self-ideals, than they might otherwise. Matheson and Zanna (1988) found that subjects using synchronous CMC exhibited more personal feelings, attitudes, values and beliefs than did those communicating face to face. As on-line senders have the possibility of creating positive pictures of themselves, on-line receivers have the tendency to evaluate their communication partners more positively

than during face to face interaction. Social Identity-Deindividuation (SIDE) theory (Lea & Spears, 1992) offers an explanation from the receiver's point of view. The theory predicts that the lack of prior personal knowledge about the communication partner and the absence of the physical cues that are usually present during face to face interaction lead to an idealized perception of the partner. On-line receivers tend to over-interpret what little data they have, and when the data are positive, reach even more positive conclusions about others than they would in face to face encounters.

So far, the characteristics of the sender and the receiver of the information, which are important for interpersonal communication via the Internet, have been described. The selective self-presentation of the sender and the idealisation of that source by the receiver are not the only important factors. The nature of the communication channel also makes a significant contribution, i.e., whether communication proceeds by a synchronous or asynchronous channel. Asynchronous CMC promotes message management and coordination that may further lead to hyper-personal communication. This is explained by Kelly, Futoran and McGrath (1990, as cited in Walther, 1996), who point out that there are differences in *'entrainment'* between groups using synchronous and asynchronous communication channels. By entrainment they mean the joint focus and coordinated information processing that group members devote to a project, despite competing demands on their attention and time. Such coordination is difficult in face to face conversation. When members in a face to face group concentrate on the task, they do not have time for social comments. According to Kelly and McGrath (1985) when time is limited and entrainment is strained, positive social relational aspects of communication are ignored, and meetings are more impersonal. There are no such problems in asynchronous communication because communication partners can take part in their group's activities at times of their own convenience and other group members do not have to be active at the same time. Therefore in asynchronous CMC it is easier to converse about positive social/relational aspects. As Walther (1996) stated, "both tasks-oriented and socially oriented exchanges may take place without one constraining the time available for the other",

which leads to more interpersonal conversation between group members (Entrainment and disentrainment, para. 3).

The popular view is that an asynchronous communication process is a problem, because it is not the sequential process that people use in the face to face mode. However, according to Turoff (1991) "the real issue is how do we use the 'opportunity of asynchronous communications' to create a group process that is actually better than face to face group communications?" (p. 96). Social scientists began to notice that the greater opportunity to control asynchronous interaction may be beneficial for CMC communicators. Hiemstra (1982) reported that during asynchronous interaction one may plan, contemplate and edit one's comments more mindfully and deliberatively than is possible in more spontaneous conversation. Asynchronous interaction can thus be more socially desirable and effective. Research on "planned discourse" (Ochs, 1979, as cited in Walther, 1996) has shown that discourse that has been thought out and organised prior to its expression is more inter-subjective and less egocentric than unplanned discourse. Stafford and Reske, (1990, as cited in Walther, 1996) also studied the differences between asynchronous and synchronous communication channels. They showed that the more communication was exchanged via the asynchronous channel, the more favourable were the partners' perceptions of each other, their communication, and their affection.

The future dynamics of the sender-receiver-channel processes may be added through positive feedback loops and a phenomenon known as "behavioural confirmation". In the words of Walther (1996), "flattering impressions and intimacy may begin through the sender and receiver processes presented here, yet the reciprocal influence that partners exert through a process known as behavioral confirmation has profound potential to magnify those effects" (Feedback: An Intensification Loop, para. 1). The process of behavioral confirmation has been shown in a number of studies involving face to face communication, but it seems to be magnified through what is known as the "restricted media", for example during telephone conversations, and this has been demonstrated by Snyder et al. (1977). Behavioural confirmation and magnification

explains the phenomenon of idealisation in minimal-cue interaction. Now it is easier to understand how it is possible that such intimate, intense and hyper-personal interactions take place in CMC - the characteristics of the sender, the receiver, the channel and the feedback are combined.

A very comprehensive survey of the major findings, focussing on CMC's social-emotional nature (the Social-Emotion-Oriented Model of CMC), can be found in the review article by Liu (2002). Five main themes emerged from the available research:

- social and relational development - research findings show that CMC groups achieved higher levels of social and relational development than groups communicating face to face - the phenomenon known as "hyper-personal communication" (e.g. Walther, 1995, 1996; Parks & Floyd, 1996).
- individualisation - in a virtual world, people tend to be more critical and more ready to assess the information they receive than in the real world. Moreover, CMC reduces the possibility of conforming to majority judgments (Smilowitz, Compton, & Flint, 1988).
- impression development - Walther (1993) found that impression development in the virtual world tends to be gradual, slower and more positive than during face to face interaction. CMC participants can use both verbal and nonverbal cues to form images of one another.
- humour - Baym (1995) found that humour can be used in the virtual world: it can be significant in creating social meaning on-line as well being an important locus of social information. CMC participants use humour "to solve problems within the group, to produce unique identities and individuality and to create group solidarity and identity in CMC environments" (Liu, 2002, Major Findings, para. 5).
- trust - "Dana (1999) concluded that e-mail can function the same as face to face communication to foster the development of trust between middle-managers and local/remote staff in their organizations" (Liu, 2002, Major Findings, para. 6).

In order to answer the question about the possibility of on-line personal relationships the different theoretical frameworks have been presented above. Some of them, such as cue-filtered theories, are pessimistic about CMC's opportunity to facilitate the development of a personal relationship in a world without physical cues. According to these theories CMC is more task-oriented than personal or socio-emotional, and this has been confirmed in many research studies (already mentioned). At the same time, however, there are results which demonstrate that without time limitations CMC becomes interpersonal and even more personal than face to face communication.

2.1.2. Prevalence and quality of on-line friendships

Although the phenomenon of on-line friendships is a very new area of research, more and more social scientists have been trying to find answers to the questions concerning the prevalence and the quality of on-line friendships. These researchers aim to understand the process of formation and maintenance of deep, personal relationships in a virtual world.

Their aim is to investigate the prevalence of on-line friendships among young Internet users and to determine whether there are quality differences between on-line and face to face friendships. In order to address these questions, the following studies are worth paying attention to:

- Parks and Floyd's (1996) examination of the quality and prevalence of friendships among participants in newsgroups;
- A study by Parks and Roberts (1998), which uses the same methodology focussing on real-time text-based virtual environments known as MOOs (Multi-User Dimensions, Object Oriented);
- Katz and Aspden's (1997) survey of Internet users;
- McKenna, Green and Gleason's (2002) study of Internet users concerning relationship formation in a virtual world (Study 2).

How prevalent are on-line friendships among young Internet users?

The primary finding of Parks and Floyd's (1996) study was that personal relationships were common in the virtual world. Just over 60% of participants reported that they formed a personal relationship with someone they had met for the first time via Internet newsgroups. The positive response to this question was given as equally likely across the many different types of newsgroups that were examined. Opposite-sex relationships were formed by slightly more than 55% of the participants, same-sex relationships by about 55% and only about 8% were romantic.

Parks and Roberts (1998) also evaluated the prevalence of on-line relationships. They focused on Multi-User Dimensions, Object Oriented (MOOs). As many as 93,6% of the participants of this study reported that they had formed new personal relationships as a result of participating in a MOO. Most respondents had formed more than one personal relationship during their interactions on MOOs. Close friendships (40,6%) were more common than friendships (26,3%) or romantic relationships (26,3%). Opposite-sex relationships constituted the most common type (83,6%); this type of relationship constituted the majority among friends (74%), among close friends (90%) and among romantic relationships (84%).

Katz and Aspden (1997) also examined friendship creation via the Internet. A significant minority (82 respondents of 601 Internet users - 14%) of participants of their study reported knowing people, whom they consider their friends, only through the Internet. However, a substantial proportion of those who reported meeting on-line friends said they had made numerous friendships. "Thirty percent of the group (24 respondents) reported having established friendships with 1 to 3 people, 40% (32 respondents) with 4 to 10 people, 22% (18 respondents) with 11 to 30 people, and 9% (7 respondents) with 31 or more people" (Katz & Aspden, 1997, Number of friendships formed, para. 1). Katz and Aspden (1997) concluded their survey with the following words: "Our survey suggests that the Internet is emerging as a medium for cultivating friendships. (...) Far from a nation of strangers, the Internet is creating a

nation richer in friendships and social relationships" (Pessimism for Pessimistic Theories, para. 3).

Are there quality differences between on-line and face to face friendships?

McKenna, Green and Gleason (2002) showed that on-line relationships are stable over time. The participants were asked about the present status of the relationships they had reported in a study carried out two years before.

The results showed that on-line relationships remained relatively stable and durable over the two-year period. "Indeed, the stability of these Internet relationships compares quite favourably to that of relationships that form and endure solely in the traditional face to face world. For example, in a classic study by Hill, Rubin and Peplau (1976), 45% of their dating couples had ended their romantic relationships prior to the conclusion of the 2-year study." (McKenna et al., 2002, Results and Discussion, para. 2). As much as 75% of all reported on-line relationships were still intact after two years. Moreover, the majority of them were reported as being closer and stronger. In addition, 84% of the participants of the study described their Internet relationships as real, as important and as close as their non-Internet relationships.

The duration of on-line relationships examined by Parks and Floyd (1996) ranged from less than a month to six years, but almost 70% of relationships were less than a year old. A typical relationship reported by the participants in Parks and Roberts's (1998) study had lasted just over a year.

Parks and Floyd (1996) explain that as relationships develop, we observe "increases in interdependence, in the breadth and depth of interaction, in interpersonal predictability and understanding, in the change towards more personalized ways of communication, in commitment, and in the convergence of the participants' social networks" (How developed do on-line personal relationships typically become?, para. 1).

The participants in their study who reported having an on-line personal relationship rated its level of development by responding to items measuring each of the above mentioned seven relational dimensions. A midpoint of the seven- point scale was used as a reference point. This procedure allows for an evaluation of whether the responses were below, above or in the middle of the scale. A moderate level of interdependence characterised the sample as a whole. Approximately half (50,5%) of the respondents were above and 49,5% were below the midpoint of the interdependence scale. As relationships develop, the variety of topics, activities and communication channels increases. These are aspects measured by the breadth scale. Over half of the respondents (57%) rated their on-line relationships above the midpoint of that scale. On the depth scale, which measures intimacy and self-disclosure, almost two thirds (61,2%) of the respondents recorded scores in the upper half of the scale. The situation differed when the communication code was concerned. According to Bell and Healey (1992) specialized ways of communicating, such as personal idioms, allow communication partners to express themselves in more efficient ways. Only 21,4% of the subjects in the Parks and Floyd survey reported the development of such communication codes above the midpoint of this scale. Just under half of the respondents (49%) rated their relationships above the midpoint of the commitment scale. Only 31,3% of the relationships were rated in the upper half of the network convergence scale, which means that most participants in the study tended not to introduce their on-line friends to their family and other friends. The results of this study showed that 30% of the subjects had a less developed on-line personal relationship, while about 30% of relationships were considered as highly developed. About 40% of the respondents had no on-line relationships.

To sum up, personal relationships among newsgroup participants were common and of high quality. For most of the participants in Parks and Floyd's (1996) study, the virtual world was just another place where people meet and get to know one another.

Parks and Roberts (1998) administered the scale previously used by Parks and Floyd (1996) in order to assess the level of development of both on-line and off-line

relationships. Just as in the study by Parks and Floyd (1996), seven dimensions of relationship development were measured: interdependence, breadth, depth, code change, predictability/understanding, commitment and network convergence. The results showed that most respondents (approximately 60-90%) rated their on-line relationships above the midpoints on nearly every scale, except on the network convergence scale.

The next step was the comparison of the development of on-line and off-line relationships. The results showed that off-line relationships were of greater duration and respondents spent significantly more hours per week with their off-line partners than with their MOOs partners. The off-line relationships were characterized by greater interdependence, predictability/ understanding, commitment and off-line network convergence." Although those differences were significant, they were not large in an absolute sense - averaging about one-third of a standard deviation" (Parks & Roberts, 1998, Results, para. 11). There were no differences between on-line and off-line relationships in terms of breadth, depth and code-change dimensions.

The last step was to compare the development of MOOs relationships, newsgroups relationships (from the study by Parks & Floyd, 1996) and off-line ones. The analyses revealed that the mean score for newsgroup relationships was lower than the mean score for MOOs relationships and off-line relationships. Newsgroup relationships were less developed than either MOOs or off-line relationships.

The research described above also shows that cyberspace is just another place to meet and maintain close, personal relationships. Almost all participants in the Parks and Roberts study formed on-line personal relationships. According to Parks and Roberts (1998) "MOOs provide users with the perception of a safe environment for social interaction in which individuals can explore all types of relationships without fear of repercussions in their physical lives" (Discussion, para. 5). Not only did the majority of respondents form on-line relationships, but these relationships also reached

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moderate to high levels of development. Although off-line relationships were generally more developed overall, the differences were small on several dimensions and more importantly, there was no difference between off-line and on-line relationships in terms of the levels of breadth and depth achieved.

As Parks and Roberts (1998) stated: "The results of this study, combined with those of the previous study of newsgroups, shatter the image that 'cyberspace' and 'real-life' are unrelated (…). There was no neat line dividing 'virtual' from 'real' relationships for our respondents. For them 'cyberspace' is not some exotic technological fantasy, but instead simply another place where people meet and get to know one another. As one respondent commented: 'MOOs friendships are real friendships because they're with real people'" (Parks & Roberts, 1998, Discussion, para. 17)

Up to this point, the theoretical background and research results concerning the quality and prevalence of on-line relationships have been presented. Now attention will be paid to the research and theories aimed at answering questions concerning the characteristics of individuals who turn to the Internet to satisfy their social needs, to join meaningful groups and to find close personal relationships. Social scientists have been trying to investigate what kind of people tend to look for and build on-line friendships and in particular:

- What kinds of individual differences (demographic, psychological and social) are related to looking for on-line friendship?
- What factors differentiate people who have started personal relationships on-line from those who have not?
- What factors are important for the development of on-line friendships?

2.2. Individual differences

A certain type of person may be more likely than another to look for and develop personal relationships on-line: some demographic, psychological or social factors may predispose people to seek out and make friends in the virtual world.

2.2.1. Psychological characteristics

McKenna, Green and Gleason (2002) proposed a very interesting model of relationship formation on the Internet. They hypothesised that those who can better express their true selves on the Internet than in their non-Internet areas of life will be more likely to form close relationships on-line. They proposed two determinants of who might be more likely to locate their true selves on the Internet: those who are socially anxious in traditional, face to face interaction settings, and those who are lonely. In order to test their hypothesis they randomly selected twenty Usenet newsgroups, and over a 3-week period, questionnaires were e-mailed to every fifth poster in each newsgroup selected. The response rate was 34%, 333 females and 234 males. The results confirmed their initial predictions. Those who feel lonely and experience social anxiety during non-Internet social interaction tend to turn to the virtual world as a means of expressing facets of themselves that they are unable to express in their non-Internet lives. These people are also more likely to form strong attachments to those they meet on the Internet. "Indeed, their on-line relationships generally develop more quickly as compared to their non-Internet relationships. They also tend to eventually bring Internet friends into their real life, through phone conversations, exchanging letters and pictures, and meeting them in person. (…) In sum, Internet acquaintanceships can and do develop into close and even intimate relationships" (McKenna et al., 2002, Study 1, Results and discussion, para. 5).

From research concerning off-line relationships, we know that some psychological characteristics (e.g. sociability) are very important predictors of successful friendship formation and maintenance while other psychological traits (e.g. shyness) can inhibit one and make it more difficult to find friends.

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In the words of Bernardo Carducci from his article "Shyness: The new solution" (2000): "At the core of our existence as human beings lies a powerful drive to be with other people. There is much evidence that in the absence of human contact people fall apart physically and mentally; they experience more sickness, stress and suicide than well-connected individuals. For all too many people, however, shyness is the primary barrier to that basic need" (para. 2).

Shyness can be defined as "discomfort and inhibition while in the presence of others" (Cheek & Buss, 1981, p. 330). It has been found that shy people have less satisfactory interpersonal involvements and fewer friends (Jones & Russell, 1982). They also tend to talk less and to be described by others as unfriendly (Cheek & Buss, 1981). Those who become anxious when meeting new people, talking to individuals they find attractive, or engaging in social group activities, such as parties, may not experience the benefits of close personal relationships.

It could be that individuals having difficulties with making friends off-line might experience the same difficulties on-line. Shyness and sociability may be factors that predict the development of friendships, reflecting the same influence in CMC as in face to face communication. Backer and Mark (1998, as cited in Utz, 2000) found that most individuals experienced the same degree of shyness on-line as off-line. Utz (2000) in her research asked whether the general trait of sociability influences the development of relationships via CMC. She found significant but only moderate correlations between sociability and on-line friendship formation and concluded that "sociability influences the formation of online relationships to a moderate degree" (Utz, 2000, Effects of sociability and skepticism, para. 2).

On the other hand, shy and inconspicuous people may profit by the anonymity of the Internet. Katz and Aspden (1997) found no statistical relationships between the propensity to make friends and measures of social connectedness. They commented on

the results with the following words: "This perhaps points to the Internet de-emphasizing the importance of sociability and personal differences" (Katz & Aspden ,1997, The Internet is emerging as a medium for friendship creation, para. 3). In a virtual world "many of the situational factors that foster feelings of social anxiety (e.g., talking to someone face to face, having to respond on the spot with verbal exchanges) are absent. Due to the absence of many of the anxiety-enhancing factors that exist in face to face interactions, shy individuals may then find it easier to form relationships on the Internet" (McKenna & Bargh, 2000, Social anxiety, para. 1). CMC allows people to overcome the shyness they may feel in face to face interactions. They can achieve this through repeated conversation with people on the Internet and slowly become more comfortable. They cannot be judged primarily by their appearance, they do not have to fear any consequences off-line, and may therefore feel encouraged to approach other people.

Sproull and Kiesler (1996) argue that the use of e-mail enables people who are peripheral in groups to become more visible. Roberts, Smith, and Pollock (1997) studied MOOs- and IRC-users and found that individuals who consider themselves as shy reported that they were less inhibited and less conservative in on-line environments. Almost half of Knox et al.'s, (2001) respondents reported that they felt "less shy on the Internet than face to face" (Findings and Discussion, para. 4). Cooper and Sportolari (1997) advised therapists to emphasise to their shy clients the value of using the computer to enhance social skills and confidence. The research results by McKenna and Bargh (1999a, as cited in McKenna & Bargh, 2000) also show that social anxiety is a strong predictor of Internet relationships formation. Those who scored high on Leary's Interaction Anxiousness Scale were more likely to form close personal relationships on-line than those who were not so shy and anxious in social situations. In the study by Albright and Conran (1994) it appeared that shy adolescents had fewer communication problems while communicating via the Internet than during face to face interaction. Moreover, during on-line interaction their social abilities were improving. According to Reid (1991) CMC communication makes it easier for a shy

person to make friends because in a virtual world one can be oneself without worrying about societal restrictions.

Another factor that is linked to the process of making friends is extroversion /introversion. The terms introversion and extroversion, which literally mean "inward turning" and "outward turning", were first used by Carl Jung, and more recently popularised by Hans Eysenck. According to the Gale Encyclopaedia of Childhood & Adolescence (1998) introverts are "individuals who are quiet, reserved, thoughtful, and self-reliant" (Introversion, para. 1). They are likely to mull things over before formulating a reaction, and their energy is regenerated by time spent alone. Introversion is generally defined in comparison to its opposite, extroversion, which is used to describe people who draw most of their energy from social interaction and respond to external stimuli immediately and directly. Extroverts are often leaders, work well in groups, and prefer being with others to being alone. They are also characterised by optimism and risk taking. "Extroverts more readily develop inter personal intelligence, which has to do with making friends easily, demonstrating leadership ability, and working effectively with others in groups. In introverts the more highly developed traits are more likely to be those associated with intra personal intelligence, such as the deeper awareness of one's feelings and the ability to enjoy extended periods of solitude" (Gale Encyclopaedia of Childhood & Adolescence, 1998, Extroversion, para. 3). When it comes to socialising, introverts often focus their attention on only one or a few best friends rather than a larger social group. They are more likely than extroverts to act differently in public to how they act at home because they feel less at ease among strangers. They tend to be more reluctant than extroverts to talk about their inner feelings.

Taking into account the characteristics of introverts and extroverts, it seems that those traits are connected with the ability to look for and find friends. Extroversion seems to predispose individuals to have a large social network and many friends. For introverts it can be more difficult to make friends. Kraut et al. (1998) stated that social extroversion influences the number of friendships that an individual maintains in

non-Internet life, and indeed found a positive correlation between the size of the social networks and social extroversion. However, because extroverts tend to be attracted to stimulating, new environments, they may go on-line to seek out the new and exciting. Therefore, it is possible that a positive association can be found between extroversion and the use of the Internet. On the other hand, taking into account the characteristics of the virtual world, such as greater anonymity, it could be that introverts find it easier to look for friends on-line. Greater social extroversion predicted less Internet use among the participants of the Kraut et al. (1998) study: "Preliminary analyses showed that more extroverted individuals subsequently used the Internet less" (Size of participants' social networks, para. 1). Petrie and Gunn (1998, as cited in Hills & Argyle, 2002) found that intensive users of the Internet tend to be introverted. Hamburger and Ben-Artzi (2000) examined the relationship between personality tendencies and Internet usage. Three types of Internet services were found: social services, information services and leisure services. "For men, extroversion was positively related to the use of leisure services and neuroticism was negatively related to information services, whereas for women, extroversion was negatively related and neuroticism was positively related to the use of social services" (Hamburger & Ben-Artzi, 2000, Abstract).

It may be that extroversion /introversion affects the behaviour of people on-line and the formation of on-line friendships in the same direction as the formation of face to face friendships or that on the contrary, the relation between those two variables is different in virtual reality.

2.2.2. Social factors

Psychological characteristics are not the only predictors of the tendency to look for and develop on-line personal relationships. Some social conditions, such as loneliness, poor social support or the size of their social network may predispose some individuals to turn to virtual reality and look for deep, personal relationships there.

Although shyness and loneliness are distinct constructs, they tend to overlap - measures of each typically correlate in the 0,40 to 0,50 range and both are linked to unsatisfactory social interactions (Asche, 2001). Perse and Rubin (1990, as cited in Asche, 2001) defined loneliness as a sense of isolation that persists over time. According to Spitzberg and Canary (1985) lonely people tend to be deficient in communication skills, which isolates them from the very social activities that might reduce loneliness. Although shy or socially anxious people are often lonely, this is not always the case. There are many individuals who are lonely but not shy. "In some cases loneliness may be a temporary condition, occasioned perhaps by changing jobs or moving to a new city. In others, it may be chronic (e.g. for the homebound, for single working mothers with small children and little or no time left for socializing)" (McKenna & Bargh, 2000, Loneliness, para.1).

Kling (1996) concluded that the Internet is "especially attractive to people who have trouble getting out of their homes to socialize with people, who are handicapped, feel socially insecure, live alone with children, work at unusual hours, and so on. For people with restricted social lives, electronic systems may provide truly important avenues to expand their social circles" (Socializing and romance on-line, para. 7). The Internet may be the place to make new friends for lonely people through newsgroups, e-mail, listserves or chat rooms.

The results of McKenna and Bargh's study (1999a, as cited in McKenna & Bargh, 2000) also demonstrate that those who are socially anxious and lonely are more likely to form intimate relationships with others via the Internet. In their study, one's expressed degree of loneliness proved to be a strong predictor for the formation of on-line relationships. Some researchers did not find a connection between the use of the Internet and loneliness. For example, Kraut et al. (1998) did not find a connection between loneliness and Internet use. Initial loneliness did not predict subsequent Internet use among the participants in their study. Moreover, their results, based upon two years of study, revealed that people who used the Internet more often subsequently reported larger increases in loneliness than those who used the Internet

less often. In the words of McKenna and Bargh (2000), "The Internet would seem to be double edged when it comes to loneliness; lonely people may meet others over the Internet and so decrease their degree of loneliness, but protracted time on the Internet necessarily takes time away from one's existing, non-Internet relationships and could thus impact those, thus increasing loneliness eventually for some individuals" (Loneliness, para.1).

Kraut et al. (1998) investigated whether a connection existed between the size of the participants' social networks and their Internet use and were able to demonstrate that people who had larger local social circles were lighter users of the Internet. This means that those respondents who had larger social resources used the Internet less often than those whose social resources were limited. The size of the participants' local social network was measured by asking respondents about the number of people in the Pittsburgh area with whom they socialized at least once a month. The size of their distant social network was defined as "the number of people outside of the Pittsburgh area who you seek out to talk with or to visit at least once a year" (Kraut et al., 1998, Social involvement and psychological wellbeing, para. 2).

Kraut et al. (1998) also examined the relationships between people's use of the Internet and their social support. Social support was defined as the "self-reported measure of social resources that theoretically derive from the social network" (Social involvement and psychological wellbeing, para. 3). Social support can be understood as emotional, informational, or companionship resources provided by network members that help individuals deal with everyday problems or crisis events (Bryan, Fitzpatrick, Crawford, & Fischer, 2001). Family and friends are regarded as the two most important sources of support. According to Carbery and Buhrmester (1998), after romantic partners, "friends are reported as young adults' number one companions and confidants, and along with mothers, are primary sources for all facets of social support" (p. 405).

The measure of social support is connected with loneliness. They both measure the consequences of having social contact. According to Kraut et al. (1998) "the two measures are correlated (r=0,60). However, whereas the loneliness scale focuses on psychological feelings of belonging, the social support scale includes components measuring the availability of tangible resources from others (e.g., a loan), intangible resources from others (e.g., advice), and reflected esteem (e.g., respect for abilities)" (Kraut et al., 1998, Social support, para. 2). It is possible that the association between looking for/developing on-line relationships and social support is a negative one. This may mean that individuals with much social support may not have the motivation to use the Internet and look for friends in a virtual world. This prediction was confirmed in Kraut et al.'s study (1998), in which a negative correlation between these two variables was found.

2.2.3. Demographic characteristics

Parks and Floyd (1996) have been attempting to find an answer to the question: Who has on-line personal relationships? They compared people who did and did not have an on-line personal relationship in terms of their demographic characteristics and patterns of Internet involvement. They found that women are significantly more likely than men to have formed a personal relationship on-line. Among the participants in their study, 72,2% of women had formed a personal relationship and only 54,5% of men had. Boneva, Krout and Frohlich (2001) investigated gender differences in how relationships are maintained by e-mail. Compared to men, women found e-mail contact with friends and family more gratifying. Women more often than men maintained kin relationships by e-mail and used e-mail to keep in touch with people who lived far away. Women's messages were filled with more personal content and were more likely to be exchanged in intense bursts. According to the authors the fit between women's expressive styles and the features of e-mail seems to be making it especially easy for women to expand their distant social networks. McKenna et al. (2002) also analysed gender differences in on-line friendships. They found that women tended to characterise their on-line relationships as more intimate than men did.

Moreover, women described the relationships they formed over the Internet as being significantly closer and deeper than males did.

Parks and Floyd (1996) found no relation between age and the likelihood of looking for and finding personal relationships on line, and no connection was found in the case of marital status: "Married, never married, and divorced respondents were equally likely to have personal relationships that started in cyberspace." (Parks & Floyd, 1996, Who has on-line personal relationships?, para. 3). They concluded that developing an on-line personal relationship is more a function of simple experience than it is of demographic or personality factors: "As people get used to and involved with their favourite newsgroups over time, they appear to start developing personal relationships with one another" (Parks & Floyd, 1996, Who has on-line personal relationships?, para. 4).

2.2.4. Other factors

According to Katz and Aspden (1997), "the propensity to form friendships through the Internet appeared to relate more strongly to general measures of Internet usage and experience, rather than demographic variables" (The Internet is emerging as a medium for friendship creation, para. 2). On-line friendships were formed by 9% of novice Internet users, 13% of users with average Internet skills, 22% of those with above average skills and 27% of those with excellent skills. Parks and Floyd's study (1996) also shows that the best predictors of the quality of on-line personal relationships were the duration and frequency of their respondents' participation in newsgroups. Significant differences were found between those who formed on-line friendships and those who did not, when the duration of participation in the particular group was taken into account. "Those who had formed on-line relationships had been reading their particular newsgroup longer (M=13,34 months) than those who had not (M=8,03 months). Moreover, those with a relationship had been posting to their particular newsgroup longer (M=12,04 months) than those without one (M=6,94 months)" (Parks & Floyd, 1996, Who has on-line personal relationships?, para. 4).

The participants in Parks and Floyd's (1996) study usually formed on-line relationships after one year on-line. These research results are consistent with Walther's Social Information Processing Model (1992). According to this model, time is a crucial element in the development of on-line relationships. Walther (1992) argued that if there is sufficient time, the differences between CMC and face to face encounters diminish. Given increasing time, people learn to verbalise on-line that which is nonverbal off-line. Lea and Spears (1995) agree with Walther that on-line relationships develop more slowly than real-life relationships. The results of the Pew Research Center's survey (2000) also showed that with increasing time on-line, people tended to observe improvements in their social interactions.

Apart from experience and the amount of time spent on-line, there may be other factors that predict the formation of on-line relationships. One of them could be disbelief, doubt or uncertainty that one might meet friends in the virtual world - scepticism towards the usefulness of CMC for developing on-line personal relationships.

Utz (2000) investigated whether scepticism towards CMC can influence the process of on-line friendships' formation. According to her, if people consider CMC as impersonal and not appropriate for making friends, this attitude will influence their behaviour. "As a result, their CMC will be impersonal even if they are quite sociable in other situations. A sceptical person will neither believe in the possibility of developing friendships via CMC in general nor in the specific possibilities provided by MUDs" (Utz ,2000, Research on Computer-Mediated Communication, para 18). Her assumption is in line with the research concerning attitude and attitude-behaviour consistency. According to Tesser (1995) attitudes are to some extent useful in predicting actual behaviour. That is, the very general evaluations that people make of themselves, other people, objects, and issues can influence their behaviour. According to Baron and Byrne (1997), "contrary to early findings, recent evidence indicates that attitudes do indeed influence behaviour" (p. 128).

Utz (2000) found that a negative attitude or scepticism towards CMC were indeed important predictors of the development of on-line relationships. A significant correlation, $r(99)=-0.50$; $p<0.01$ (one-tailed) was found between skepticism and on-line friendships. "The more sceptical about CMC's friendly capacities a person is, the less s/he develops friendship" (Utz, 2000, Effects of sociability and skepticism, para. 2). Regression analysis also confirms this statement. "The results indicate that skepticism towards CMC (…) predicts the development of relationships in MUDs" (Utz, 2000, Regression analysis, para. 2).

People may use the Internet for many different purposes. Sproull and Faraj (1995, as cited in Kraut et al., 1998) wrote that it could be used to communicate and socialise with colleagues, friends, and family as well as to join social groups through distribution lists, newsgroups, and MUDs. Over half of Knox et al.'s (2001) respondents listed research/academic work as the primary reason for using the Internet. Social interests were listed by 44% of them. As it was stated: "Over forty percent of our respondents reported that their goal in meeting new people on the Internet was to find someone as a friend. Looking for romance or a potential mate were goals for only 1% and 5% of the respondents respectively" (Knox et al., 2001, Findings and Discussion, para. 1). It is possible that the goals and motivation for using the Internet influence the process of making on-line friends.

According to Utz (2000), motivational factors have to be taken into consideration. If the data about the number of friends acquired in different settings on the Web are compared, it transpires that 73,6% of friendships are found in MUDs (Utz, 2000), 93,6% in MOOs (Parks & Roberts, 1998), and 60,7% among newsgroup users (Parks & Floyd, 1996). These figures can be regarded as reflecting the underlying motivation for making friends. "MOOs are built for socializing; MUDs have the additional role-play and game-component, whereas newsgroups are primarily intended for discussing certain topics. Individuals may participate in a newsgroup to gain

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information as well as to form relationships, most MOOs and MUDs are less information oriented" (Utz, 2000, Discussion, para. 4). If people use the Internet just for entertainment, information, and commerce and not for social reasons, such as finding friends, it may be less possible for them to meet on-line friends. Utz (2000) also investigated if "the motivation for playing MUDs (i.e. games, role-play) affects relationship building, such that role-play oriented users form more friendships than game-oriented users" (Research on Computer-Mediated Communication, para. 21). In her article she stated: "People may play MUDs just for the fun of the game or for role-playing, and if their reason for playing MUDs is not to meet other people, this should have an impact on forming friendships. To them other MUDders are considered part of the game, fighting the same dangers, not as persons with whom interpersonal bonds could be formed. If the goal is playing a game and not joining the virtual community, fewer friendships should be developed" (Utz, 2000, Research on Computer-Mediated Communication, para. 21).

Utz's reasoning is consistent with the research results concerning motivation and its influence on peoples' achievements. The relationship between motivation and achievement is well-documented in research. For example, Walberg (1984, as cited in Gagne & Pere, 2002) found an average correlation between motivation and school learning. Brasile, Kleiber, and Harnisch (1991) define motivation as "a process through which persons take available resources - time, talent, and energy - and distribute them in a way they choose" (p. 18). If Internet users distribute their time, talent and energy to look for on-line friends, it may be more likely that they find meaningful deep, personal relationships in the virtual world.

Utz (2000) indeed found that motivation plays an important role as a factor related to looking for and forming on-line personal relationships. A hierarchical cluster analysis was conducted and four types of MUDders emerged: "role-players, game players, involved ones and sceptical ones". The participants of group three, ie. the involved ones, managed to develop significantly more friendships than the participants of the other groups. The participants in this group may be characterised by low scepticism,

but they are not game-players or role-players. As Utz (2000) stated: Those players "seem to be very involved in the virtual world per se. They may be 'chatters', who visit virtual worlds to meet other people" (Types of MUD Players, para. 2).

The existing literature does not provide a clear answer to the question of which factors predict the tendency to look for and build on-line personal relationships. However, some evidence was found that the relevant factors would include sociability, shyness, extroversion/ introversion, loneliness, social support, the size of the social circle, time and experience on-line, scepticism and also motivation.

The literature review reveals some important findings that have implications for the research to be carried out.

- Firstly, the majority of researchers found that personal relationships are common in virtual reality.
- Secondly, there is no consistent picture of the influence of the Internet on the quality of personal relationships. Even though research results have showed that on-line personal relationships can be of high quality (Parks & Floyd, 1996) and some researchers have even stated that they can be of a higher quality than off-line relationships, most findings confirmed that on-line relationships do not reach the level of development that can be reached by off-line relationships (Parks & Roberts, 1998).

There is also no solid theoretical background concerning the factors which affect the formation and the development of personal relationships on-line. Researchers have not so far developed a clear picture of the person who is most likely to look for friends on-line and to build personal relationships in virtual reality.

Chapter 3
Method

3.1. Key variables and hypotheses

3.1.1. The prevalence and the quality of on-line friendships

In the previous chapter a number of studies were discussed which examined the possibility of building deep and intimate relationships in virtual reality (see section 2.1.1).

Among the questions that were raised were:

- How prevalent are on-line friendships among young Internet users?
- Are there differences in quality between on-line and FtF (face to face) friendships?

The research results varied. Some provided examples of on-line friendships of high quality, whereas others considered virtual relationships as shallow, meaningless and temporary. Overall, the research findings seemed to confirm that people do find friends on-line, even though the quality of such relationships might be questionable. It was suggested that on-line relationships could reach a moderate, or even high, level of development, but so far there has been little evidence that on-line relationships can be of higher quality than off-line relationships.

A conclusion that derives from the findings is that however possible and successful on-line relationships are, they tend to be of lower quality than off-line ones. This suggests the following questions that need to be investigated:

- How prevalent are on-line friendships among young Internet users?
- Are there differences in quality between on-line and face to face friendships?

The On-line Relationships Scales (Parks and Floyd, 1996) were used to measure the development of on-line (Q22 and Q25)[1] and off-line (Q22) friendships, which suggests the following research questions and hypothesis to be tested:

R_1: What is the frequency (n; %) of Internet users with on-line friends in the population from which the sample was drawn?

R_2: What is the distribution of on-line friendships in the population from which the sample was drawn?

H_1: The scores on the On-line Relationships Scales show a higher degree of development for off-line friendships (Q22) than for on-line friendships (Q22 and Q25).

3.1.2. Individual differences

In the previous chapter the literature concerning factors which predispose people to seek and make friends in the virtual world was presented. Researchers have considered the following questions:

- What kinds of individual differences (psychological, social, demographic) relate to looking for on–line friendships?
- What factors differentiate people who have started friendships on-line from those who have not?
- What factors are important for the development of on-line friendships?

Psychological factors

The majority of social researchers have agreed that psychological factors are crucial predictors of who will look for, find and develop an intimate personal relationship (see chapter 2, section 2.2.1). With few differences, most of the research results have confirmed that shy individuals tend to look for friends in the virtual world and that

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[1]The numbers of questions in the questionnaire (see Appendix 9) are presented in brackets.

they are more likely to form on-line friendships than sociable and outgoing people who have no difficulty engaging in off-line interactions.

Shyness was assessed with four items from the Cheek and Buss (1981) shyness/sociability scale[2] (Q9).

Forming on-line friendships: The respondents were asked whether they had:

- any on-line friends (the frequency) (Q19),
- their best friend in the virtual world (Q21).

The following research hypotheses are suggested:

H_2: People who look for on-line friends (Q16) score significantly higher on the shyness/sociability scale (for shyness) (Q9) than those who do not.

H_3: People who have on-line friend(s) (Q19, Q21) score significantly higher on the shyness/sociability scale (for shyness) (Q9) than those who do not.

Researchers have found a significant relationship between shyness and the development of friendship in off-line settings. What still needs to be investigated is whether shyness has an effect on the development of on-line friendships. This can be examined by testing the following hypothesis:

H_4: There is a significant relationship between the scores derived from the shyness/sociability scale (for shyness) (items from Q9) and the On-line Relationships Scales (Q22 and Q25).

It may be concluded from the existing research results that sociability is less relevant to the development of on-line friendships than to the development of off-line relationships. However, lack of consistent empirical data leads to the question about

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[2] Shyness and sociability are measured by different items of the same scale. They are not the opposite end of the same scale.

the relationship between sociability and the looking for, formation and development of on-line friendships.

Sociability was assessed with two items from the Cheek and Buss shyness/sociability scale (1981) (Q9) and, therefore, the following research hypotheses is put forward to examine the relationship:

H_5: There is a significant relationship between the score on the shyness/ sociability scale (for sociability) (Q9) and looking for on-line friends (Q16).

H_6: There is a significant relationship between the score on the shyness/ sociability scale (for sociability) (Q9) and having on-line friends (Q19, Q21).

H_7: There is a significant relationship between the scores derived from the shyness/sociability scale (for sociability) (Q9) and the On-line Relationships Scales (Q22, Q25).

Another factor that relates to the process of making friends is extroversion. The research findings regarding the relation between extroversion and Internet use are diverse, thus the following research question is formed:

- What is the relationship between extroversion and looking for on-line friends?

Extroversion/ introversion (Q10) was measured by using the Polish version (Brzozowski & Drwal, 1995) of the Eysenck, Eysenck and Barrett (1985) EPQ-R questionnaire (short-scale EPQ-R) excluding the psychoticism scale, which suggests that the following hypotheses should be tested:

H_8: There is a significant relationship between the score on the extroversion/ introversion scale (Q10) and looking for on-line friends (Q16).

H_9: There is a significant relationship between the score on the extroversion/ introversion scale (Q10) and having on-line friends (Q19, Q21).

According to the available research, in off-line circumstances extroverts are likely to make more friends than introverts, but it is doubtful whether the same is true in the virtual world. This is why the question concerning the relationship between extroversion /introversion and the formation and development of on-line relationships arises. This can be examined by testing the following hypothesis:

H_{10}: There is a significant relationship between the scores on the extroversion/ introversion scale (Q10) and the On-line Relationships Scales (Q22, Q25).

Social factors

A relation has been found between feelings of loneliness and the use of the Internet (see chapter 2, section 2.2.2). Although it seems plausible that the more lonely the individual, the more likely he or she is to turn to the Internet in order to look for social contacts, the research results concerning this relation are not consistent. Therefore, an open research question is formulated:

- Does loneliness relate to looking for on-line friends?

Loneliness was measured by two items from the UCLA Loneliness Scale (Version 2) (Russell, Peplau, & Curtona, 1980) and one additional question (Q11). The next hypothesis of this study is therefore:

H_{11}: There is a significant relationship between the scores on the loneliness scale (Q11) and looking for on-line friends (Q16).

The issue of the influence of on-line interactions on loneliness has created a division among researchers into those who state that the use of the Internet decreases the feeling of loneliness, and their opponents. Therefore, the following hypothesis concerning the relationship between having on-line friends and loneliness arises:

H_{12}: There is a significant relationship between the scores on the loneliness scale (Q11) and having on-line friends (Q19, Q21).

The research outcomes have confirmed that having friends decreases the feeling of loneliness. However, there is no agreement whether this relation is relevant in the virtual world and on how the quality of on-line friendship affects the feeling of loneliness. Therefore, the following research hypothesis is formulated:

H_{13}: There is a significant relationship between the scores on the On-line Relationships Scales (Q22, Q25) and the loneliness scale (Q11).

Social network and social support are factors which can relate to seeking on-line relationships. Researchers have found a relation between the size of social networks and time spent on-line as well as between the amount of social support and time spent on-line. People who lack social resources from their off-line settings tend to turn to the virtual world:

- People who look for on-line friends have significantly less social support than those who do not.
- People who look for on-line friends have significantly smaller social networks than those who do not.

Social support was measured by nine items taken from the Simet, Dahlem, Zimet and Furley (1998) multidimensional scale of perceived social support (Q12).

Social network was indicated by three measures: the number of friends (Q18 and 19), the number of people in the respondents' local area with whom they socialise at least once a month (Q13) and the number of people outside their local area whom they seek out to talk with or visit at least once a year (Q14).

Therefore, the following hypotheses are put forward:

H_{14}: People who look for on-line friends (Q16) receive a significantly lower score on the social support scale (Q12) than those who do not.

H_{15}: People who look for on-line friends (Q16) have significantly fewer people in their local (Q13) and distant (Q14) areas to socialise with than those who do not.

H_{16}: People who look for on-line friends (Q16) have significantly fewer friends (Q18, Q19) than those who do not.

Research has shown that social support is connected with the availability of tangible and intangible resources from others. Researchers have also shown that friends are a very important source of social support. It is probable that the same relation is present in the virtual world. That is, the more on-line friends one has and the more developed one's friendships are, the more social support one receives. However, the research results concerning the impact of Internet use on social support varied. Some researchers, among them Silverman (1999) and Winzelberg (1997), suggested that Internet use increases social support. Others argued that the use of the Internet reduces an individual's feeling of social support (Kiesler & Kraut, 1999).

This implies that the question concerning the relationship between the number and the quality of on-line friendships and perceived social support needs to be investigated. Therefore, the following hypotheses are formulated:

H_{17}: There is a significant relationship between having on-line friends (Q19, Q21) and the scores on the social support scale (Q12).

H_{18}: There is a significant relationship between the scores on the On-line Relationships Scales (Q22, Q25) and the social support scale (Q12).

Demographic characteristics

The majority of researchers have not detected any substantial relationship between the use of the Internet and such demographic characteristics of the respondents as their age or marital status (see chapter 2, section 2.2.3). Since the respondents of this survey were mainly single students between 20 and 26 years old, variables like age and marital status were not analysed. Instead, the relation between the pursuit of on-line friends and having a dating partner was investigated.

Most research results have confirmed the existence of relations between gender and the building of personal relationships on-line as well as between gender and the quality of personal relationships:

- Women are significantly more likely than men to look for on-line friends.

- Women are significantly more likely than men to form on-line friendships.

- There is a statistically significant difference between the quality of on-line friendships formed by women and men.

- Having a regular partner affects looking for personal relationships on-line.

Hence, the following hypotheses are formulated:

H_{19}: Women (Q3) are significantly more likely than men to look for friends on-line (Q16).

H_{20}: Women (Q3) are significantly more likely than men to form on-line friendships (Q19).

H_{21}: Women score significantly higher than men (Q3) on the On-line relationships Scales (Q22, Q25).

H_{22}: There is a significant relationship between having a regular partner (Q5) and looking for personal relationships on-line (Q16).

Time spent on the Internet

The research results (see chapter 2, section 2.2.4.) have indicated that one of the best predictors of the quality of on-line personal relationships is experience in using the Internet (i.e. the number of years one has been using the Internet) as well as the duration and frequency of the Internet sessions. This suggests the following research questions:

- People who look for on-line friends have been using the Internet significantly longer (are more experienced Internet users) than those who do not.

- People who look for on-line friends have been using the Internet for significantly more hours during the week than those who do not.

- People who look for on-line friends have had significantly longer sessions on the Internet than those who do not.

- People who form on-line friendships have been using the Internet

significantly longer than those who do not.

- People who form on-line friendships have been using the Internet for significantly more hours during the week than those who do not.

- People who form on-line friendships have had significantly longer sessions on the Internet than those who do not.

- There is a positive relationship between the length of time spent on-line and the quality of on-line friendships.

Experience in using the Internet was measured by the number of months/years that one has been using the Internet (Q6); *Time on-line* was measured by the amount of time spent on-line during the week (hours) (Q7); and an *Internet session* was measured by the average duration in terms of the minutes/hours of a session (Q8). This suggests the following hypotheses that should be tested:

H_{23}: People who look for on-line friends (Q16) have been using the Internet for significantly more years/months (Q6) than those who do not.

H_{24}: People who look for on-line friends (Q16) have been using the Internet for significantly more hours during the week (Q7) than those who do not.

H_{25}: People who look for on-line friends (Q16) have had significantly longer sessions on the Internet (Q8) than those who do not.

H_{26}: People who form on-line friendships (Q19, Q21) have been using the Internet for a significantly longer time (years/months) (Q6) than those who do not.

H_{27}: People who form on-line friendships (Q19, Q21) have been using the Internet for significantly more hours during the week (Q7) than those who do not.

H_{28}: People who form on-line friendships (Q19, Q21) have significantly longer sessions on the Internet (Q8) than those who do not.

H_{29}: There is a positive relationship between the amount of experience with the Internet (years/months) (Q6) and the score on the On-line Relationships Scales (Q22, Q25).

H_{30}: There is a positive relationship between the number of hours a week spent on-line (Q7) and the score on the On-line Relationships Scales (Q22, Q25).

H_{31}: There is a positive relationship between the average duration (minutes/ hours) of an Internet session (Q8) and the score on the On-line Relationships Scales (Q22, Q25).

Other factors

In the previous chapter (see section 2.2.4.) it was shown that according to some researchers, scepticism about the capacity to make friends through the Internet actually impedes the development of on-line relationships. Therefore, the following postulates are formulated:

- People who look for on-line friends are significantly less sceptical than those who do not.
- People who form on-line friendships are significantly less sceptical than those who do not.
- The less sceptical a person is about making friends via the Internet, the better the quality of his or her on-line personal relationships.

Scepticism about friend-making via the Internet was measured by seven items based on Utz's scepticism scale (2000) (Q17), which suggests that the following hypotheses need to be examined:

H_{32}: People who look for on-line friends (Q16) receive significantly higher scores on the scepticism scale (Q17) than those who do not.

H_{33}: People who form on-line friendships (Q19, Q21) have significantly higher scores on the scepticism scale (Q17) than those who do not.

H_{34}: There is a significant positive correlation between the scepticism scale (Q17) and the On-line Relationships Scales (Q22, Q25).

According to researchers in the field, motivation to find on-line friends is another important predictor of the development of personal relationships in the virtual world.

Those who use the Internet mainly to communicate and socialise with other people (i.e. when more than 50% of their time is spent on-line) are more likely than others to find sincere on-line friendships. This implies that the following relations should be examined:

- Those who look for on-line friends are more likely to be socially-oriented than task-oriented Internet users.
- Socially-oriented Internet users form more on-line friendships than task-oriented ones.
- There is a statistically significant difference between the quality of on-line friendships formed by socially-oriented Internet users and those formed by task-oriented ones.

Motivation to use the Internet was measured by looking at the purpose for which the Internet was used (Q15). The following categories of users were distinguished in this way:

- Socially-oriented users are people who mainly make use of social services (for more than 50% of their time on the Internet);
- Task-oriented users are people who mostly make use of the Internet to look for information, etc.; i.e., they use the Internet for tasks that are not socially oriented (for more than 50% of their time on the Internet).

The next hypotheses therefore are:

H_{35}: People who look for on-line friends (Q16) form more on-line friendships (Q19, Q21) than those who do not.

H_{36}: People who look for on-line friends (Q16) spend more than 50% of their time on the Internet using social services.

H_{37}: People who spend more than 50% of their time on the Internet using social services (Q15) form more on-line friendships (Q19, Q21) than those who spend more than 50% of their time on the Internet using non-social services (Q15).

H_{38}: The On-line Relationships Scales show statistically significant differences in scores (Q22, Q25) between users who spend more than 50% of their time on the Internet using social services (Q15) and users who use non-social services for more than 50% of their time on the Internet (Q15).

3.2. Measurement instrument

It was decided to gather data by means of a questionnaire. As Breakwell, Hammond and Fife-Schaw (1997, p. 174) put it, "The principal advantages of the questionnaire are its apparent simplicity, its versatility and its low cost as method of data gathering." The questionnaire (Appendix 9) contained:

- demographic items to characterize the sample with regard to school attended, age, sex and marital status;
- measures of the extent of the Internet use;
- items concerning individual differences, behaviours and attitudes, such as: sociability/shyness, extroversion/introversion, loneliness, social support, social networks, motivation to use the Internet;
- items that assessed the nature and the development of friendships (on-line or off-line).

The questionnaire consisted of open questions which were used to gather numerical data such as age or time, items where the respondents had to choose one out of a number of possible responses, and items where the respondents had to rate some statement on a measurement scale. The latter involved the 2, 4, 5 or 7-points numerical Likert scales, used to assess individual differences as well as the level of development of personal relationships.

3.3. Measurements

3.3.1. Demographic questions

The respondents were asked about their age, gender, marital status, regular partner as well as about the type of school they attended.

3.3.2. Off-line/on-line friendships

The fact that a relationship was defined as being a friendship by the respondents to the study made up the operational definition of friendship.

Friendship was measured by:

- the frequency (n; %) of the Internet users who reported having on-line friends,
- the frequency (n; %) of the Internet users who reported having their best friend on-line,
- the frequency (n; %) of off-line friendships reported,
- the frequency (n; %) of on-line friendships reported,
- the proportion of reported on-line friendships to all friendships (on-line and off-line).

The next task assigned to the respondents was to classify their friendships according to the types that were provided.

For on-line friendships, these were:

- partners who **only** meet on-line,
- partners who met and **mainly** meet on-line but they **also** meet outside the Net,
- partners who met on-line but they meet **mainly** outside the Net.

For off-line friendships, these were:

- partners who meet **only** outside the Net,
- partners who met outside the Net but they **also** meet on-line,
- partners who met outside the Net but they meet **only** on-line.

3.3.3. Looking for on-line friends

The respondents were asked to choose between two options (Yes or No).

3.3.4. Quality of on-line/off-line friendships

The On-line Relationships Scales, devised by Parks and Floyd (1996) to assess the development of on-line relationships, were also applied in this study to measure the quality of different types of both on-line and off-line relationships. To make the questionnaire shorter and easier to respond to, only some items from the original scale were used, keeping to the criteria of redundancy (some items were very similar to each other) and face validity. The questions concerning exclusively on-line relationships were omitted, whereas the ones measuring the seven dimensions of relationship development were all included. These refer to: interdependence, breadth, depth, code change, predictability/understanding, commitment and network convergence. The items were scored on a seven-point scale, where higher values indicated a higher level of agreement. In most cases, the higher the score, the more developed the relationship was considered, but some scores were reversed so higher values meant lower levels of relationship development.

The Interdependence subscale consisted of four items, which measured the depth and complexity of dependence between the participants in the relationship. Two items made up the breadth subscale, which evaluated the variety of topics, and four items made up the depth subscale, which measured intimacy and self-disclosure. The communication code change was measured with a three-item subscale. According to Parks and Floyd (1996), this subscale evaluates how "the participants evolve specialized ways of communication, such as personal idioms, that allow them to express themselves in more efficient ways" (How developed do on-line personal relationships typically become?, para. 4). The predictability/understanding dimension of relationship development was assessed using three items designed to measure the degree of confidence about the partner. The commitment subscale consisted of three items, which measured involvement in the relationship. Finally, three items made up

the network convergence subscale, which evaluated whether the participants introduced each other to their friends and family and developed a common social circle (on-line and off-line).

The respondents were asked to single out the most advanced of their friendships and answer questions about the duration and type of the relationship chosen. Then, they were asked to answer questions concerning the level of development of their relationships.

Since the respondents were supposed to choose the most developed of their friendships, it was possible that all of them would select one of the types of off-line relationships. To make sure that the quality of on-line relationships was also measured, those who did not evaluate their virtual friendship in the previous section were now requested to focus on their most developed on-line acquaintanceship and answer the questions about its duration, type and the level of development according to the Parks and Floyd scale.

3.3.5. Sociability/Shyness

Sociability/Shyness was assessed with the six items from the Cheek and Buss shyness/sociability scale (1981). Four items constituted a shyness subscale and two items constituted a sociability subscale. The respondents were asked to rate each item on the scale from the least characteristic (one point) to the most representative (five points). The total score ranged from 6 to 30. The score for the shyness subscale ranged from 4 to 12 and in general, the higher the score the higher the shyness level, although the second item was reverse scored, so the higher the score the lower the level of shyness. The score for the sociability subscale ranged from 2 to 10 and the higher the score, the higher the sociability level. The two subscales are negatively correlated, although some of the items that make up the scales are positively correlated (Cheek & Buss, 1981).

3.3.6. Extroversion/ introversion and neuroticism

Extroversion/ introversion and neuroticism were measured by the Polish version devised by Brzozowski and Drwal (1995) of the Eysenck, Eysenck and Barrett EPQ-R questionnaire (short-scale EPQ-R) excluding the psychoticism scale. This scale consists of a reduced number of items compared to the original version (33 items), eleven of which measured extroversion/introversion, another eleven concerned neuroticism, and the last eleven comprised a lie scale. The original short-scale EPQ-R consists of 48 items. As the researchers (Hamburger & Ben-Artzi, 2000) were interested mostly in the relation between extroversion/introversion and Internet use and the former is closely connected with the ability to form friendships, the neuroticism and lie scales were not taken into consideration in the data analysis of the present study.

The respondents were asked to choose between the answers Yes and No to each item on the scale. The extroversion/introversion factor was made up of 11 items that collectively yielded a score in the range of 0 to 11. For some items the answer Yes yielded one point, for other the answer No yielded one point. The scale is bipolar, which means its ends are extreme opposites. Individuals scoring high on the extroversion scale are considered more extroverted than people with low scores, defined as more introverted.

3.3.7. Scepticism

The scale *scepticism* was based on the items from the scale devised by Utz (2000). It was meant to measure the attitude towards the social potential of CMC and the Internet. The respondents were asked to answer seven questions on a five-point scale, where they could express strong disagreement (one) to strong agreement (five). The items concerned the belief that making friends and voicing emotions adequately on the Internet is possible. The total score ranged from 7 to 35. On the whole, the higher the scores, the lower the level of scepticism they represented. The exceptions were the

first, third and sixth items which were reverse scored so the level of scepticism increased along with the score.

3.3.8. Loneliness

Loneliness was measured by two items from the UCLA Loneliness Scale (Version 2) (Russell et al., 1980) and one additional question. The loneliness scale was constructed in this way because all the other questions from the original UCLA scale resembled the ones from the Social support scale used in this research. Each item of the loneliness scale was rated on a four-points scale, when one meant "never" and four meant "often". The total score ranged from 3 to 12. The higher the score the higher the loneliness level. The first item was reverse scored, so the higher score meant a lower level of loneliness.

3.3.9. Social support

Social support was measured by nine items taken from the Simet et al. (1998) multidimensional scale of perceived social support. The measure of perceived social support assesses whether individuals perceive that there are people around to whom they can turn for support (Cohen & Hoberman, 1983). Recent research suggests that perceived support is more psychologically salient and meaningful than other types of support, for example objective or structural support (Swickert, Hittner, Harris, & Herring, 2002). The original scale consisted of twelve items measuring three sources of support, namely family, friends and significant others. In order to make the questionnaire shorter, only one item from the subscale Significant Other was used. The decision to exclude items measuring support from significant others was made taking into account redundancy (items from the Friend and Significant Other subscales were very much alike), face validity as well as the results of the factor analysis of the translated version of the scale (Chou, 2000). Chou found that a two-factor solution (Friend and Family Factors) was more meaningful and easier to interpret.

There were five items which measured "perceived social support from friends", and four which measured "perceived social support from family". The respondents were asked to rate each item on a seven-point scale, where subsequent points varied from strong disagreement (one) to full agreement (seven). The total score ranged from 9 to 63, whereas the subscale 'Friends' score ranged from 5 to 45 and the 'Family' subscale from 4 to 36. The level of perceived social support grew along with the score.

3.3.10. Social network

Size of local social network: The participants were asked to estimate the number of people in their local area whom they socialise with at least once a month. *Size of distant social network*: The participants were asked to estimate the number of people from outside of their local area whom they seek out to talk with or visit at least once a year. *Social network* was also measured by the participants' reported number of friends (off-line and on-line).

3.3.11. Internet usage

Three aspects of Internet usage were measured: the extent of respondents' experience in using the Internet, time spent on-line during the week and the duration of the Internet sessions. *Experience in using the Internet* was measured by asking the participants for how many years/months they had used the Internet. *Time on-line* was assessed by asking them how much time on average they spent on-line during the week (i.e. how many hours per week). In addition, the respondents were also asked about the average duration of their *Internet sessions* (minutes/hours). The acquired data might be considered subjective since it was self-reported. However, other research showed a substantial agreement between self-reported time and objectively measured data (Zielke, Schildmann, & Wirausky, 1995).

3.3.12. Motivation for using the Internet

In order to measure the motivation for using the Internet, the participants were asked for what purpose they used the medium. Moreover, they were requested to estimate the

amount of time devoted to particular on-line activities. They were asked to divide a total of 100% between the different activities they performed on-line to show how much time they spent on each of them. Socially-oriented users and task-oriented users were distinguished on the bases of the previous research results (Hamburger & Ben-Artzi, 2000).

Socially-oriented users were defined as those people who spent more than 50% of their time on the Internet using mainly social services such as: social correspondence, newsgroups, discussion groups, chats, gadu-gadu, IRC, web games and MUDs. The question about looking for on-line friends also distinguished between socially-oriented and task-oriented Internet users. *Task-oriented users* were defined as those people who spent more than 50% of their time on the Internet on the following non-social activities: business matters, looking for information, shopping, surfing the Web pages just for entertainment, downloading files, including music files or games.

3.4. Respondents and sampling

The respondents were young Internet users. The sample group consisted of students from establishments providing free access to the Internet. Because the sample is opportunistic and self-selective, there is a limitation on the extent to which the results can be generalised.

The questionnaire was converted into HTML format and put on a server in order to make it accessible on the Internet. All the responses were collected in MS Access Database. After the process of data gathering had been completed, the results were exported to the Excel format for further analysis. To reduce the cost of developing and maintaining the web application mentioned above, it was necessary to share the website with another researcher. All the respondents were directed to where the two questionnaires were available (that of the author of this dissertation and another student's questionnaire). The computer allocated the respondents randomly (with 0,5

probability) to either of the questionnaires. Therefore, only half of the students who responded had the opportunity to fill in the questionnaire belonging to this dissertation.

Two methods of recruitment of subjects were applied. As the main method (which from now onward will be called direct), contact letters were sent to the students' e-mail boxes. Students of the Polish-Japanese Institute of Information Technology (PJWSTK) (n=1400) and students of the Psychology Department of Warsaw University (n=1400) were targeted. Permission was obtained from the President of PJWSTK and the President of the Psychology Department of Warsaw University to send the letters to the students' private e-mail boxes. The students from the PJWSTK are mainly male, aged 19-28. The students of psychology from Warsaw University are mainly 19-28 year old females. The contact letters informed the recipients about the survey and contained the web address for the questionnaires. Approximately 10% of the students had no e-mail addresses or their e-mail boxes were out of reach, so the final target group was reduced to a total of 1260 students. By using the direct mail method, data were collected from 235 students. The response rate was almost 19% (see details in tables 3.1 and 3.2).

Table 3.1: Responses to both questionnaires (direct method)

No. of students	No. of students with valid e-mail	No. of responses	Response rate (%)
2800	2560	491	19

Table 3.2: Responses to the questionnaire compiled by the author of this dissertation (direct method)

Estimated population for the questionnaire	No. of responses	Response rate (%)
1260	235	19

As an additional method (which from now onward will be referred to as indirect), in order to significantly enlarge the group of respondents and to make the whole sample more heterogeneous, the link with the web address for accessing the questionnaires was made available on the main web pages of the PJWSTK, the Psychology

Department of Warsaw University and the Warsaw Economics School (SGH). In addition, in order to inform the students about the survey, posters with the web link to the questionnaires were distributed on the main premises of the PJWSTK, the SGH and the Psychology Department of Warsaw University.

It was discovered that a significant number of students declined to respond to the questionnaire because of its length (information acquired from the website administrator). Therefore, in order to obtain as good a response rate as possible, it was decided to use only part of the questionnaire for each particular respondent. Consequently a two-step process was used for assigning subjects.

Firstly, the respondents were randomly directed to one of the two questionnaires available. Next, those who had been chosen for the questionnaire of the author of this dissertation were randomly (with 0,5 probability) allocated either to the part concerning the quality of friendship (Part A - questions 20-25 in the questionnaire – Appendix 9; n=135) or the other part concerning individual differences (Part B - questions 9-12 and 17; n=183). All the respondents could voluntarily fill in the rest of the questionnaire but only twenty-one (n=21) respondents participating in the study through the web pages did so. It should also be noted that all the respondents filled in the common part of the questionnaire, which included demographic questions (1-5), questions regarding the Internet usage (6-8, 15-16) and interpersonal relationships (13-14, 18-19).

In sum, 339 out of 574 respondents filled in the questionnaire by the indirect method (see details in tables 3.3, 3.4, and 3.5).

Table 3.3: Number of respondents recruited by the indirect method

Part of the questionnaire	No. of respondents
Part A (quality of friendship)	135
Part B (individual differences)	183
Part A+ Part B	21
Total	339

Table 3.4: Total number of respondents

Part of the questionnaire	Direct method	Indirect method	Total
Whole	235	21	256
Only Part A	-	135	135
Only Part B	-	183	183
Total	235	339	574

Table 3.5: Number of responses

Number of responses for:	
Part A	391
Part B	439
Whole questionnaire	574

The purpose of this chapter was to perform three tasks. Firstly, the literature study of chapter 2 was used to develop research questions, which in turn were used to develop testable hypotheses. Secondly, the questionnaire was described, to show where the measurements that are to be used in testing the hypotheses come from, and finally the sample was described, along with how the subjects were recruited.

Chapter 4

Data analysis

4.1. Statistical tools

The data was captured in Excel and the statistical package Statgraphics version 5 Plus was used to analyse the survey results.

4.2. Characteristics of respondents

The sample and procedures are described in chapter 3.

4.2.1. Demographic data

The data was collected from 574 respondents who filled in the questionnaire. The average age of each respondent was 22,30 years. Among the respondents female students represented 47% of the sample, while male students accounted for 53%. The majority of respondents (95%) were single but nearly 50% of them reported that they had a regular partner. The detailed figures for the demographic composition of the groups of respondents are presented below (Tables 4.1 to 4.4).

Table 4.1: Frequency distribution of gender

Gender	Frequency	Percentage
Female	271	47,21
Male	303	52,79
Total	574	100,00

Table 4.2: Descriptive statistics for age

	Mean	SD	Min	Max	N
Age (years)	22,30	3,32	14,0	50,0	568

Table 4.3: Descriptive statistics for marital status

Marital status	Frequency	Percentage
Divorced	4	0,70
Married	25	4,36
Single	545	94,94
Total	574	100,00

Table 4.4: Descriptive statistics for romantic partner

Romantic partner	Frequency	Percentage
No	279	50,82
Yes	270	49,18
Total	549	100,00

4.2.2. Internet Usage

Usage of the Internet was indicated in this study by three variables. Firstly, experience in using the Internet was measured by the period of time each respondent had been using the Internet (in months), secondly by the number of hours the respondent spent on-line in a week and finally by the average duration of the Internet session (in minutes). The results showed that the respondents had been using the Internet on average for 48 months (4 years), that they spent on average almost 18 hours on-line in a week and that the an average duration of their Internet session was slightly more than 123 minutes (2 hours). Table 4.5 below presents the results.

Table 4.5: Descriptive statistics for Internet usage

	Mean	SD	Min	Max	N
Internet experience (months)	48,02	26,02	0,0	240,0	574
Hours on-line	17,73	17,72	0,0	160,0	567
Duration of session (minutes)	123,27	134,24	0,0	1440,0	574

An additional analysis was run to check whether there was a difference between males and females in their Internet usage. The results of the F-test turned to be statistically significant for all three measures of this usage. It was showed that males had been using the Internet significantly for more years, spent more hours a week on-line and they had longer Internet sessions than females. Table 4.6 below documents the details.

Table 4.6: One-way analysis of variance - the effect of gender on Internet usage

	F	d.f.	p	Females	Males
Internet experience (months)	49,77	1 ; 572	0,0000	40,24	54,98
Hours on-line	37,93	1 ; 565	0,0000	13,06	21,95
Duration of session (minutes)	19,60	1 ; 572	0,0000	97,46	146,35

4.2.3. Methods of data gathering

Because two methods of data gathering were used (direct e-mail and WWW) an additional analysis was necessary to show that the two samples did not significantly differ in terms of the key variables of this research. As can be seen in Table 4.8, the fact that the sample was collected in two different ways did not introduce bias into the measurements that were investigated. The results of these analyses are shown below (Tables 4.7 and 4.8).

Table 4.7: Descriptive statistics for the method of data gathering

Method of data gathering	Frequency	Percentage
Direct e-mail	235	40,94
WWW	339	59,06
Total	574	100,00

Table 4.8: One-way analysis of variance - the effect of two methods of data gathering

	F	d.f.	p	Mean for direct e-mail	Mean for WWW
Intra - extroversion	0,00	1; 437	0,9922	7,66	7,67
No. of on-line friends	2,11	1; 519	0,1472	1,57	2,24
Scepticism	1,13	1; 437	0,2880	2,56	2,63
Quality of all on-line friendships	0,00	1; 165	0,9743	13,89	13,87
Quality of the best friendship	0,31	1; 374	0,5804	17,67	17,53

4.3. The prevalence of on-line friendships

One of the main questions to be answered in this research concerns the prevalence of on-line friendships:

- How prevalent are on-line friendships among young Internet users?

The following two research questions will address the issue:

R_1: What is the frequency (n; %) of Internet users with on-line friends in the population from which the sample was drawn?

R_2: What is the distribution of on-line friendships in the population from which the sample was drawn?

The respondents were asked whether they had on-line friends or not, as well as to report the number of on-line friendships. Almost all respondents answered the first question (566 respondents) and 521 respondents answered the second question. The results (Table 4.9) showed that more than 47% of the respondents had at least one on-line friend (271 respondents). The respondents reported having on average 2 on-line friends. The analysis of the prevalence of on-line friends revealed that more than 17% of respondents had one on-line friend, more than 7% had two on-line friends, more than 6% had three friends on the Internet and about 3% had more than four on-line friends. The details are presented below (Table 4.9 and Figure 4.1).

Table 4.9: Frequency distribution: the Internet users with on-line friends

Value	Frequency	Percentage
No	295	52,12
Yes	271	47,88
Total	566	100,00
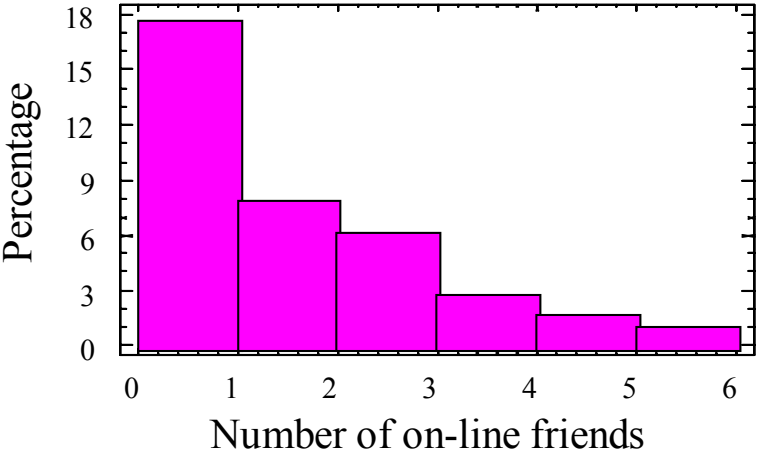
Figure 4.1: Percentage distribution for the number of on-line friends

In order to gain a broader picture of the prevalence of friendships, the respondents were not only asked about the number of their on-line friends but also about the number of their off-line friends. They reported having on average almost 11 friends

per person. Most of the reported relationships were off-line with an average of 9 friends per respondent. The details are displayed below (Table 4.10) and in Appendix 1 (Figures 1-2).

Table 4.10: Descriptive statistics for the number of friends

	Mean	SD	Min	Max	N
Number of friends	10,86	17,83	0,0	190,0	558
Number of off-line friends	9,03	15,56	0,0	170,0	557
Number of on-line friends	1,97	5,13	0,0	52,0	521

The next research problem which was analysed concerned the difference between the prevalence of off-line and on-line friendships. The results of the t-test revealed that there was a statistically significant difference between the prevalence of on-line and off-line friendships in the sample. The respondents reported having significantly more off-line friendships than on-line friendships (t =10,14; p=0,000). The details are shown in Appendix 1 (Table 1 and Figure 3).

In addition, in order to gather information about the types of on-line and off-line friendships the respondents were also asked to classify their friendships. Several different types of friendships were identified. There were three types of off-line friendships:

a.   when partners meet **only** outside the Net,

b.   when partners met outside the Net but they **also** meet on-line,

c.   when partners met outside the Net but they meet **only** on-line.

There were three types of on-line friendships:

d.   when partners met on-line but they meet **mainly** outside the Net,

e.   when partners met and **mainly** meet on-line but they **also** meet outside the Net,

f.   when partners **only** meet on-line.

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The majority of friendships were classified as type **a** (49,46%) with an average of 5,38 friends per respondent and type **b** (29,80%) with an average of 3,24 friends per respondent. Fewer relationships were classified as types: **c** (3,80%), **d** (3,93%), **e** (5,27%) and **f** (7,76%). The F-test indicated a statistically significant difference between the means of the prevalence of different types of friendship. The Multiple Range tests identified three homogenous groups within which there was no difference between the means. That is, there was no statistically significant difference between the means of types c, d, e, and f (first group). However, there was a significant difference between type b (second group) and type a (third group). Because the Levene's test indicated a statistically significant difference between standard deviations, a non-parametric Kruskall-Wallis test was computed, which also showed statistically significant differences between the prevalence of different types of friendships. The results of the tests are presented in Appendix 1 (Tables 2-5).

4.4. The quality/development of on-line friendships

An analysis of the prevalence of different types of friendships (on-line and off-line) in the sample has now been carried out. The next research question concerns the difference in the quality of on-line and off-line friendships:

- Are there differences in the quality of on-line and face to face friendships?

The following research hypothesis was formulated:

H_1: The scores on the On-line Relationships Scales show a higher degree of development for off-line friendships (Q22) than for on-line friendships (Q22 and Q25).

Three methods were used to show the quality (development) of on-line friendships. Firstly, the durations of friendships were assessed. Secondly, in order to see the absolute level of the development of different categories of off-line and on-line relationships the means and theoretical midpoints of the On-line Relationships Scales

were compared. And finally, the means of the subscales of On-line Relationship Scales for different categories of on-line and off-line friendships were compared.

In order to obtain a clear picture of on-line personal relationships and to enrich the analysis, five categories of friendship were distinguished in this research: *best friendship, best on-line friendship, best off-line friendship, on-line friendship* and *all on-line friendships*.

The respondents were asked to select the best of their friendships, specify its length and type (off-line/on-line) and also to evaluate the level of its development by responding to items on each of the seven subscales of the On-Line Relationships Scales (see section 3.3.4. of chapter 3). This category, called *best friendship*, attracted 376 respondents (96,16%). The type of relationship (off-line/on-line) singled out at this stage determined respondents' further moves. They focused either on *the best on-line friendship* or *best off-line friendship* subcategories. The majority of the respondents (85,10% of 376) chose the latter division and only 10,11% (of 376) reported their best friends as being from the virtual world.

The following part of the questionnaire was meant to be filled in exclusively by the respondents having on-line friends and by those who did not evaluate the development of their on-line relationships in the previous section of the questionnaire. Questions regarding the duration, kind and development of their *on-line friendships* were answered by 35,29% of the respondents. In addition to the above mentioned categories, it was decided to distinguish *all on-line friendship* (best on-line plus on-line) as a separate category (n=167; 42,71%).

Not all 391 respondents filled in the part of the questionnaire concerning the development of their friendships. The results showed that many more respondents had their best friend off-line (85,10%) than on-line (10,11%). However, as much as 35,29% (n=138) of all of them reported having on-line relationships that could be

referred to as friendships, and they evaluated their level of development. In summary, 42,71% (n=167) of the respondents evaluated their on-line friendships. Table 4.11 presents the summary.

Table 4.11: Frequency distribution of different categories of friendships

Categories of friendships	Frequency	Percentage
Best friendship	376	96,16
Best off- line	320	85,10
Best on- line	38	10,11
On-line friendships	138	35,29
All on-line	167	42,71
Respondents	391	100,00

The differences in the frequency distributions are due to lack of responses to some questions, more specifically:

The category *best friendship* (n=376) is divided into two categories: *best on-line* (n=38) and *best off-line* (n=320). The difference between 376 and 358 (320+38) is due to the fact that some respondents, n=18 (376-358), answered the questions about the quality of their *best friendship* but they omitted the question about the category of this friendship (on-line or off-line). Therefore these 18 friendships are categorised only as *best friendships*.

The category *all on-line* (n=167) is divided into two categories, *best on-line* (n=38) and *on-line* (n=138). The difference between 167 and 176 (38+138) is due to the fact that some respondents n=9 (176-167) decided to evaluate both their *best on-line friendship* and their *on-line friendships*. In this case it was decided to include in the category *all on-line* only their *best on-line friendships*.

4.4.1. Duration of friendships

The following step is to analyse the difference in duration of on-line and off-line relationships. The means and standard deviations for the duration of friendships are presented in Table 4.12 below.

Table 4.12: Descriptive statistics for the duration of different categories of friendships

Categories of friendships	Duration (months): means	Duration (months): SD
Best friendship	75,7	62,4
Best off-line	84,9	61,9
Best on-line	17,5	22,8
On-line friendship	23,7	30,3
All on-line friendship	23,6	28,8

It was shown that the average duration of off-line friendships was much longer than that of on-line friendships. *The best off-line friendships* lasted on average more than seven years (84,9 months) but *the best on-line friendships* did not even last two years (17,5 months). The F-test showed statistically significant differences between the means of duration of different categories of friendships (F=65,38; p=0,000). The Multiple Range tests indicated that there were statistically significant differences between the duration of on-line and off-line friendships. Off-line friendships lasted significantly longer than on-line personal relationships. Because of the lack of a normal distribution of the samples and because the Levene's test showed statistically significant differences in standard deviations, a non-parametric test was applied, which also showed statistically significant differences in the duration of friendships (the calculations are shown in Tables 1 to 3 in Appendix 2). The t-test was also applied to check the difference in the duration of *the best off-line* and *the best on-line friendships*. *The best off-line friendship* lasted significantly longer (on average 67 months longer) than *the best on-line friendship* (t=13,30; p=0,000) (Appendix 2, Table 4). The t-test did not reveal a statistically significant difference in the duration of *the best on-line*

friendships and *on-line friendships* (t=-1,39; p=0,08). The details are documented in Appendix 2 (Table 5).

The level of development of friendships (both on-line and off-line) was assessed by items from Parks and Floyd's On-line Relationship Scales in terms of a series of seven dimensions: interdependence, breadth, depth, code change, predictability/ understanding, commitment and network convergence (see section 3.3.4 in chapter 3). Means and standard deviations for each subscale are presented in Table 4.13 below.

Table 4.13: Means and standard deviations for each subscale of the On-line Relationship Scales for three categories of friendships

| Developmental dimension (subscale) | Categories of friendships | | | | | |
| | Best off-line | | Best on-line | | On-line | |
	Observed mean	Observed SD	Observed mean	Observed SD	Observed mean	Observed SD
Interdependence	21,47	4,21	20,39	4,48	14,61	5,81
Breadth	11,84	2,19	11,53	2,76	9,71	2,98
Depth	24,71	3,51	24,18	4,67	19,63	6,12
Code change	14,68	4,59	14,50	4,20	12,64	5,12
Predictability/ Understanding	17,07	3,18	15,63	4,33	12,22	4,84
Commitment	17,69	3,43	17,92	3,46	13,73	4,07
Network	17,18	3,57	11,87	5,64	9,79	5,31

Several different analyses were made to evaluate the level of development of five different categories of friendships.

4.4.2. Absolute level of development

Firstly, following Parks and Floyd (1996) and Parks and Roberts (1998) the absolute levels of relational development of friendships were assessed by comparing the means of the developmental dimensions with the theoretical midpoints of the scales, using single sample t-tests. The results of these comparisons, as well as the observed and theoretical means for each scale, are displayed in Appendix 3. The interdependence scale of *the best off-line friendship,* for example, had a theoretical midpoint 16,00 (i.e. four items, scaled 1-7, yielding a scale range of 4,00 to 28,00). A single sample t-test was used to determine if the observed mean 21,47 was significantly greater than the theoretical mean of 16,00 (one-tailed test). In this case the result was significant (t=23,20; p<0,001).

The results showed that each subscale of *the best off-line friendships* (320 cases) was rated above the theoretical midpoints of the scale. Nearly 100% of the respondents rated their best friendships above the midpoints of each scale. The above results showed that *the best off-line friendships* were highly developed (Table 1 in Appendix 3).

On-line friendships were not rated as high as *the best off-line friendships*. The observed means of two subscales, namely, the scale that measured the degree to which partners introduced each other to the members of their social network as well as the interdependence scale, were significantly below the midpoints of the scales. In the case of the network convergence scale, approximately 30%, and in the case of the interdependence subscale 33% of the respondents rated their relationships above the midpoint of the scales. The observed means of the subscales of code change and predictability/understanding did not significantly differ from their midpoints. The observed means of the three remaining subscales, namely the breadth, depth and commitment subscales, were significantly above the theoretical midpoints. Approximately 60% of the respondents rated their *on-line friendships* above the

midpoints of these scales. This suggested that on-line friendships were less developed than off-line friendships (Table 2 in Appendix 3).

A contrary conclusion can be drawn, if instead of analysing the category of *on-line friendship*, the category of *the best on-line friendship* is examined. The results revealed that the majority of the respondents (75%) rated their on-line relationships above the midpoint of nearly every scale measuring relational development. The only exception was the measure that assessed the degree to which the on-line friend was introduced to members of the respondent's social network. Although the observed mean of this scale was below the midpoint of the scale, the difference was not statistically significant. For the remaining six scales the observed means were significantly above the theoretical midpoints. This suggested that on-line friendships could reach a very high level of development (see Table 3, Appendix 3).

Finally, the theoretical midpoints and observed means of *all on-line friendships* (best on-line plus on-line friendships) were assessed. In this case also the majority of respondents (53%) rated their on-line relationships above the midpoints of each of the seven subscales. Only the observed mean of the network convergence scale was significantly below the theoretical midpoints of the scale, and 35% of the sample scored above it. The observed mean of the interdependence scale did not differ significantly from the theoretical midpoint of the scale. The observed means of the rest of the subscales were significantly above the theoretical midpoints. Approximately 60% of the sample rated their relationship above the midpoints of these scales (see Table 4, Appendix 3).

It can be concluded from these analyses that on-line relationships could reach the same level of development as off-line relationships. The network convergence subscale was the only one that was significantly below the theoretical midpoint in all analysed categories of on-line friendship. This scale measured the degree to which partners introduced each other to members of both their off-line and their on-line social

networks (friends, family). When interpreting the results it should be taken into account that in the case of on-line relationships the convergence of social networks is often impossible due to the geographical distance between on-line friends. In order to find the answer to the research question (see page 87), the additional analyses were necessary to check how the level of development observed in on-line friendships compared with that observed in off-line friendships.

4.4.3. Comparison of quality/development of on-line and off-line friendships

The mean scores for each of the seven dimensions of friendship have now been analysed and compared. The next step is to calculate one mean for all of the seven subscales of the On-line Relationship Scales (the aggregate score) for each category of friendship distinguished in this research (on-line and off-line) and then to compare the quality of these friendships. The F-test was used to find out whether there was a statistically significant difference between the means of development of different categories of friendship. Table 4.14 shows means and standard deviations for the On-line Relationship Scales for different categories of friendship.

Table 4.14: Means and standard deviations for the On-line Relationship Scales for different categories of friendships

Categories of friendships	Mean	S. D.
Best friendship	17,61	3,89
Best off-line	17,81	2,22
Best on-line	16,58	2,60
On-line friendship	13,19	3,52
All on-line friendship	13,88	3,54

The results clearly indicated that there was a statistically significant difference between the level of development of on-line and off-line friendships (F=121,35; p=0,000). The Multiple Range tests showed that the difference between the means was only 1,23 points in the case where on-line friendships were considered by respondents

as the most important relationship of all their personal relationships (*the best on-line friendships*). However, if the comparison was made between *all on-line friendships* and *the best off-line friendships*, the difference between the means was almost four points. The difference was even greater if the level of development of *the best off-line friendship* was compared with the level of development of on-line relationships which were not the first best relationships of the respondents (*on-line friendships*). Because the Levene's test showed that the difference between standard deviations was statistically significant, a non-parametric Kruskall-Wallis test was applied, which also showed statistically significant differences between development of friendships. Tables 1 to 4, displayed in Appendix 4, show the details.

The comparison between the means of the On-line Relationship Scales of *the best off-line* and *the best on-line friendships* also confirmed the previous conclusion. Although off-line friendships were significantly better developed than on-line friendships (t=3,17; p<0,005), the difference between the means was not large (slightly more than 1 point). The details can be seen in Appendix 4 (Table 5 and Figure 1).

An additional test was applied to check the differences between the means of development of *the best on-line* and *on-line friendships*. The results, which are presented in Table 6 and Figure 2 in Appendix 4, showed a statistically significant difference between the development of *the best on-line friendships* and *on-line friendships* (t=6,54; p<0,005).

The next step in the data analysis was the comparison of the means of each subscale of the On-line Relationships Scales for all five categories of friendships, as well as the comparison of the means of each subscale of *the best on-line* and *the best off-line friendships*. The analyses were run in order to examine which areas of relationship development were similar and which were specific for on-line or off-line settings. A more detailed comparison was achieved by carrying out Multiple Range Tests. There was no significant difference in the development of *the best off-line friendship* and *the*

best on-line friendship. The only exception was the network convergence and predictability/understanding subscales, where there was a statistically significant difference between the means of the development of *the best on-line* and *the best off-line friendships*. In the case of the network convergence dimension *the best off-line friendships* were evaluated as much more developed than *the best on-line friendships* (the difference between means was more than six points). The *best off-line friendships* were about 1,5 points better developed than *the best on-line friendships* in the case of the predictability/understanding scale. The detailed analyses can be found in Appendix 5.1 (Tables 1-35 and Figures 1-7).

The results were totally different if the comparison was made between the means of the subscales of *all on-line friendships* and *the best off-line friendships* (see Appendix 5.2) In this case the level of development of *the best off-line friendships* was always significantly higher than the level of development of *all on-line friendships*.

From the analysis of the data it can be concluded that off-line friendships tended to be better developed than on-line relationships. However, when an on-line relationship was considered as the best one it reached the same level of development as a comparable off-line friendship. Therefore, H_1 received only partial support from the results. In addition, it is worth noticing that the Internet partners were not likely to introduce each other to the members of their social networks (the network convergence subscale). This dimension of relationship development was always significantly less developed in on-line relationships than in off-line ones. Table 4.15 shows differences between subscales of the On-line Relationships Scales for different categories of friendships (summary of Appendixes 5.1 and 5.2).

Table 4.15: Differences between subscales of the On-line Relationships Scales for different categories of friendships

Subscales	Categories of friendships		
	All categories	Best off-line/best on-line	Best off-line/all on-line
	F-test/ p value	t-test/ p value	t-test/ p value
Interdependence	88,22/ 0,000	1,47/ 0,071	11,00/ 0,000
Breadth	29,96/ 0,000	0,67/ 0,253	6,54/ 0,000
Depth	53,71/ 0,000	0,67/ 0,253	8,26/ 0,000
Code change	7,86/ 0,000	0,24/ 0,407	3,50/ 0,000
Predictability/ understanding	66,62/ 0,000	1,97/ 0,027	9,75/ 0,000
Commitment	49,04/ 0,000	-0,39/ 0,350	8,04/ 0,000
Network convergence	126,23/ 0,000	8,06/ 0,000	14,62/ 0,000

4.5. Individual differences

The next step in the analysis of the data was to explore the differences between those respondents who reported looking for and forming an on-line personal relationship and those who did not. Before the results of data analyses concerning individual differences are presented, the descriptive statistics show the respondents in terms of their psychological, social and other characteristics related to their Internet usage.

4.5.1. Psychological characteristics

The sample was characterised by a moderate level of shyness and an above average level of sociability and extroversion. The mean for all respondents in the case of shyness was almost 2,5 (exactly in the theoretical midpoint of the scale) and in the case of sociability it was 3,53. An average score on the extroversion/introversion scale

was 7,67; that is, more than two points above the theoretical midpoint. Table 4.16 shows the results.

Table 4.16: Descriptive statistics for psychological characteristics

Psychological characteristics	Mean	SD	Min	Max	N
Shyness	2,43	0,82	1,0	5,0	438
Sociability	3,53	0,97	1,0	5,0	438
Extroversion	7,67	3,02	0,0	11,0	439

4.5.2. Social characteristics

The sample was characterised by a below average level of loneliness. The mean for the loneliness scale was almost two, which is below the theoretical midpoint of the scale (2,5). The majority of respondents reported having an above average level of social support (mean 5,17), both from friends (mean 5,34) as well as from family (mean 4,95). The scale which measured social support ranged from one to seven. The respondents reported that they had on average 26,28 persons in their distant social network and 14,55 persons in their local social network. The results of the analysis are shown in Table 4.17 below.

Table 4.17: Descriptive statistics for social characteristics

Social characteristics	Mean	SD	Min	Max	N
Loneliness	2,09	0,71	1,0	4,0	438
Social support	5,17	1,23	1,0	7,0	438
Social support from friends	5,34	1,47	1,0	7,0	438
Social support from family	4,95	1,59	1,0	7,0	438
Distant network	26,28	47,45	0,0	500,0	542
Local network	14,55	22,72	0,0	250,0	554

4.5.3. Other characteristics

Most respondents were sceptical about the usefulness of the Internet for social contact. The mean for the sample was 2,59, which is below the theoretical midpoint of the scale. The majority of respondents were classified as task-oriented (64,29%) in comparison to socially-oriented (35,71%). The more detailed analysis of the scale measuring motivation to use the Internet showed that the mean for items measuring respondents' social orientation was 43,90 (theoretical midpoint of the scale is 50) and the mean for the items measuring task orientation was 53,93 (above the midpoint). Tables 4.18 and 4.19 present the results.

Table 4.18: Descriptive statistics for Internet attitudes

Other characteristics	Mean	SD	Min	Max	N
Scepticism	2,59	0,71	1,0	6,0	439
Social orientation	43,90	24,15	0,0	100,0	574
Task orientation	53,93	24,62	0,0	100,0	574

Table 4.19: Frequency distribution of social orientation

Social orientation	Frequency	Percentage
No	369	64,29
Yes	205	35,71
Total	574	100,00

4.6. Individual differences – looking for and forming on-line friendships

In the previous sections the data analyses concerning the prevalence and development of friendship were presented. The subsequent step in the data analysis was to discover factors which predispose people to seek and make friends on the Internet.

Firstly, it was investigated whether individuals who looked for friends on the Internet could be distinguished from those who did not in terms of the demographic, psychological, social and other characteristics related to Internet usage. The following research question is asked:

- Which individual differences (psychological, social, demographic) relate to looking for on–line friendships?

There were 183 respondents (32,50 %) in the sample who reported looking for on-line friends (Table 4.20 below).

Table 4.20: Frequency distribution: looking for on-line friends

Value	Frequency	Percentage
No	380	67,50
Yes	183	32,50
Total	566	100,00

The next step in the analysis of data was to find an answer to the following research question:

- What factors differentiate people who have started friendships on-line from those who have not?

About 48% of individuals reported having friends on-line, and for more than 10% of the respondents their friend in the virtual world was their best friend. Tables 4.21 and 4.22 below show the details.

Table 4.21: Frequency distribution: the Internet users with on-line friends

Value	Frequency	Percentage
No	295	52,12
Yes	271	47,88
Total	566	100,00

Table 4.22: Frequency distribution: the Internet users with their best friends on-line

Value	Frequency	Percentage
No	338	89,89
Yes	38	10,11
Total	376	100,00

In order to enrich the analysis, an additional variable - the proportion of the number of on-line friendships to the number of all friendships - was introduced. Several analyses were applied to check the relationship between this proportion and the individual characteristics of respondents. The descriptive statistics presented below show that the proportion of the number of on-line friends to the number of all friends in the sample is 0,15 (Table 4.23).

Table 4.23: Summary statistics for the proportion of the number of on-line friends to the number of all friends

Proportion of the number of on-line friends to all friends	Mean	SD	N
	0,15	0,22	487

Three kinds of analyses were carried out in order to find the answers to the above research questions: one- or two-factor analyses of variance, correlation analyses and regression analyses. Firstly, a two-factor analysis of variance was conducted to compare those who looked for on-line friends to those who did not, and those who had any on-line friendships to those who did not have on-line friends at all. Two factors in

the analysis were respondents' looking for/having on-line friends and the gender of respondents as well as the interaction between these factors. The interaction effect indicates the influence of different levels of one variable on the different levels of a second variable. Secondly, those who had their best friend on-line were compared to those who did not, by calculating a one-factor analysis of variance. Next, correlation coefficients were calculated and regression analyses (single or multiple) were performed in order to see the relation between the number of friends (on-line as well as off-line) and the psychological, social, demographic and other characteristics of respondents related to their Internet usage.

4.6.1. Psychological factors

The following research hypotheses concerning psychological factors are now to be analysed in this research:

H_2: People who look for on-line friends (Q16) score significantly higher on the shyness/sociability scale (for shyness) (Q9) than those who do not.

H_3: People who have on-line friend(s) (Q19, Q21) score significantly higher on the shyness/sociability scale (for shyness) (Q9) than those who do not.

H_5: There is a significant relationship between the score on the shyness/ sociability scale (for sociability) (Q9) and looking for on-line friends (Q16).

H_6: There is a significant relationship between the score on the shyness/ sociability scale (for sociability) (Q9) and having on-line friends (Q19, Q21).

H_8: There is a significant relationship between the score on the extroversion/ introversion scale (Q10) and looking for on-line friends (Q16).

H_9: There is a significant relationship between the score on the extroversion/ introversion scale (Q10) and having on-line friends (Q19, Q21).

The analysis of variance showed that there was no difference between those who looked for on-line friends and those who did not in terms of the level of shyness (F=1,45; p>0,05). However, the interaction effect proved to be statistically significant. It means that the difference in shyness between those who looked for on-line friends

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and those who did not was modified by gender. More specifically, there was no difference for females, but for male subjects those who looked for friends on the Internet tended to be shyer than those who did not. Therefore H_2 was supported only for males, but it was rejected for female respondents. Tables 1 and 3, presented in Appendix 6.1, describe the details.

The next questions to be answered in the research concerned the difference in the level of sociability and extroversion between those who looked for on-line friends and those who did not (H_5 and H_8). The analysis of variance showed that there was no difference between those two groups on the level of both sociability and extroversion (see Tables 4-5 in Appendix 6.1). However, there was a statistically significant difference between male and female on the level of extroversion (see Tables 5-6 in Appendix 6.1).

After analysing the difference in psychological characteristics between those who looked for on-line friends and those who did not, the difference in psychological factors between those who had friends on the Internet and those who did not was investigated (H_3, H_6 and H_9). The results showed that those who reported having on-line friends did not significantly differ in sociability and extroversion from those who had no on-line friends (see Tables 10-12 in Appendix 6.1). However, interaction between shyness and gender was statistically significant, which indicated that the difference in shyness between those who had on-line friends and those who did not was modified by gender (and vice versa). The additional analysis showed that neither for female nor for male subjects was there a difference in the level of shyness between those who had on-line friends and those who did not (see Table 7-9 in Appendix 6.1). Therefore H_3, H_6 and H_9 were not supported by the data analysis.

Psychological characteristics did not prove to be significant factors that differentiated those who looked for intimate personal relationships on the Internet from others. Only in the case of male subjects did the hypothesis concerning the predisposition of shy people to look for friendships in the virtual world receive support from the results

(H$_2$). The subsequent analysis focused on the differences in psychological characteristics between those who reported having their best friend on the Internet and others (H$_3$, H$_6$ and H$_9$). One-factor analyses of variance were calculated and showed that there were no statistically significant differences between the two groups in such psychological characteristics as shyness, sociability and extroversion (Table 13 in Appendix 6.1).

The next step in the data analysis was to calculate the correlations between the number of on-line friends and the individual characteristics of the respondents. For purposes of comparison, the same analysis was made for the number of off-line friends. The results (Table 14 in Appendix 6.1) showed that psychological characteristics were not equally important factors for the formation of off-line friendships and on-line friendships. None of the psychological factors reached statistical significance in the case of on-line friendships but in the case of off-line friendships shyness as well as extroversion turned out to be statistically significant. As one could expect, the number of off-line friends was negatively correlated with shyness and positively correlated with extroversion.

Next, by computing simple regression or multiple regression analyses the predictive values of respondents' individual characteristics were calculated. The results of data analysis showed that psychological factors such as shyness and extroversion were significant predictors of the number of friends one had in the off-line world (F=3,08; p<0,05). However, the model did not make very good predictions – none of the estimates of β's were significant. The situation was different for the number of friends in the virtual world. In this case, psychological traits were not statistically significant predictors (F=1,17; p=0,319). Tables 15 - 17, presented in Appendix 6.1, describe the details.

Next, the correlations between psychological factors and the proportion of the number of on-line friendships to the number of all friendships showed that the higher the

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relationship of the number of on-line friends to the number of all friends, the less sociable one tended to be. The results were statistically significant only in the case of sociability. Table 18 in Appendix 6.1 shows the calculations.

The results of these data analyses revealed that in the majority of cases psychological characteristics were not statistically significant factors that differentiated between those respondents who looked for and formed on-line personal relationships and other respondents. In addition, correlation and regression analyses revealed that psychological traits should be taken into consideration especially when analysing friendships in off-line settings. Hence, most of the hypotheses analysed in this section were rejected (H_3, H_5, H_8 and H_9). However, both H_2 and H_6 received partial support.

4.6.2. Social factors

The next group of factors that was supposed to differentiate between those who looked for and formed friendships in virtual reality, and those who did not, focused on social characteristics. The following hypotheses were explored:

H_{11}: There is a significant relationship between the scores on the loneliness scale (Q11) and looking for on-line friends (Q16).

H_{12}: There is a significant relationship between the scores on the loneliness scale (Q11) and having on-line friends (Q19, Q21).

H_{14}: People who look for on-line friends (Q16) receive a significantly lower score on the social support scale (Q12) than those who do not.

H_{15}: People who look for on-line friends (Q16) have significantly fewer people in their local (Q13) and distant (Q14) areas to socialise with than those who do not.

H_{16}: People who look for on-line friends (Q16) have significantly fewer friends (Q18, Q19) than those who do not.

H_{17}: There is a significant relationship between having on-line friends (Q19, Q21) and the scores on the social support scale (Q12).

Two-factor analysis of variance showed that those who reported looking for friends on the Internet significantly differ from those who did not, on the level of loneliness as well as in terms of the perceived social support. The results revealed that those who looked for on-line friends felt significantly more alone and received significantly less social support than those who did not look for friends in the virtual world (see Tables 1-5 in Appendix 6.2). Therefore, the findings supported H_{11} and H_{14}.

However, it was worth noticing that when social support was measured separately in terms of social support from friends and social support from family, the results were not statistically significant (Tables 6 and 8 in Appendix 6.2). There was no statistically significant difference between the two groups in either their local or their distant social networks (the concept of social network includes both on-line and off-line social contacts) or in their number of friends (Tables 9-12 in Appendix 6.2). But those who looked for on-line friends had significantly fewer off-line friends and significantly more on-line friends than those who did not report that they looked for friends on the Internet (Tables 13-16 in Appendix 6.2). Therefore, H_{15} and H_{16} were not supported by means of the analysis of data.

The next hypotheses focused on the differences between those who formed on-line personal relationships and those who did not (H_{12} and H_{17}). There was no statistically significant difference found in social characteristics between the two groups. In the case of loneliness (Tables 17-18 in Appendix 6.2) the statistically significant interaction effect ($p<0,05$) between having on-line friends and the gender of the respondent indicated that the difference in loneliness between those who had on-line friends and those who did not was modified by gender (and vice versa). However, the results for males and females separately did not possess statistical significance. The calculations are shown in Appendix 6.2 (Tables 17-26).

The next analysis focused on the difference in social characteristics between those who had their best friend on the Internet and those who did not (H_{12} and H_{17}). It was found that those who reported having their best friend on-line felt significantly more

lonely (p<0,05) than those who did not. No statistically significant differences were found in terms of such characteristics as social support nor in the local and distant social networks. However, if only support from friends was analysed the difference appeared to be statistically significant (p<0,05). Those who had their best friend in the virtual world received significantly less social support from friends than those who did not. No statistically significant differences were found between the two groups in terms of the number of friends as well as in the number of off-line friends. However, those who reported that they had their best friend on the Internet had significantly more on-line friends (p<0,05). The results of that analysis are presented in Appendix 6.2 (Table 27).

Statistically significant negative correlations were found between loneliness and both the number of all friends and the number of off-line friends. However, social support did not show a significant correlation with either the number of all friends or the number of off-line friends. The situation was different in the case of on-line relationships. The number of on-line friends was not significantly related to loneliness, support from friends or social support (H_{12} and H_{17}). The analyses are presented in Table 28 in Appendix 6.2.

The following step in the data analysis was the calculation of correlations between social characteristics of respondents, such as loneliness and social support, and the proportion of on-line friends to all friends (H_{12} and H_{17}). The results (see Table 28 in Appendix 6.2) indicated statistically significant correlations in the case of loneliness and social support from friends, which implied that the more on-line friends one had in comparison to all friends, the higher his or her loneliness level and the lower the support from friends tended to be.

Not only were correlation coefficients calculated in order to explore the relation between loneliness, social support and the number of friends (on-line as well as off-line) but regression analyses were also performed. The results showed that both the

number of all friends, as well as the number of off-line friends, were statistically significant variables in predicting the loneliness level (p<0,05) but not in predicting social support from friends. However, the number of on-line friends could not be used in predicting either the value of loneliness or the value of social support from friends (H_{12} and H_{17}). Tables 29-30 in Appendix 6.2 show the calculations.

The results showed that social characteristics were in most cases very important (statistically significant) factors in the formation of both on-line and off-line friendships. Only H_{15} was rejected. The remaining hypotheses received either support (H_{11} and H_{14}) or at least partial support ($H_{12,}$ H_{16} and H_{17}) from the results of data analysis.

4.6.3. Demographic characteristics

The following hypotheses were formulated regarding demographic characteristics of the sample:

H_{19}: Women (Q3) are significantly more likely than men to look for friends on-line (Q16).

H_{20}: Women (Q3) are significantly more likely than men to form on-line friendships (Q19).

H_{22}: There is a significant relationship between having a regular partner (Q5) and looking for personal relationships on-line (Q16).

In order to find answers to the above hypothesis the Chi-Square tests were applied. The results showed that those individuals who reported that they looked for on-line friends did not significantly differ from those who did not look for on-line friends, in terms of gender and marital status. However, those with no regular partner were significantly more likely to look for on-line friends. Therefore, H_{19} was rejected and H_{22} was not rejected in the data analysis. The details are presented in Tables 1-3 in Appendix 6.3.

Next, the difference between males and females in the number of on-line friends (as well as in the number of all friends and off-line friends) was investigated by the F-test (H_{20}). The results (Table 4 in Appendix 6.3) did not show any statistically significant difference between males and females regarding the number of friends in all three cases.

The analysis of data also revealed that there were no statistically significant differences in demographic characteristics, such as gender, between those who had their best friend on-line and those who did not (H_{20}). Table 5 in Appendix 6.3 shows the results.

The results of this data analysis showed that demographic characteristics of respondents rarely differentiated between those who looked for and formed on-line personal relationships and those who did not. Neither H_{19} nor H_{20} were supported by the data analysis. However, it was shown that having a regular partner affected looking for personal relationships on-line (H_{22}).

4.6.4. Internet usage

To this point, it has been shown that those respondents who looked for friends in the virtual world can be distinguished from those who did not do so, especially in terms of their social characteristics. Individuals who looked for social contact on the Internet tended to feel more lonely and receive less social support than those who did not look for on-line friends. The two groups did not significantly differ in terms of demographic characteristics (gender, marital status) or in their level of extroversion. There could be some other factors connected with Internet usage, which differentiate those who look for/have on-line friends from those who do not. Therefore, the following hypotheses were analysed:

> H_{23}: People who look for on-line friends (Q16) have been using the Internet for significantly more years/months (Q6) than those who do not.

H_{24}: People who look for on-line friends (Q16) have been using the Internet for significantly more hours during the week (Q7) than those who do not.

H_{25}: People who look for on-line friends (Q16) have had significantly longer sessions on the Internet (Q8) than those who do not.

H_{26}: People who form on-line friendships (Q19, Q21) have been using the Internet for a significantly longer time (years/months) (Q6) than those who do not.

H_{27}: People who form on-line friendships (Q19, Q21) have been using the Internet for significantly more hours during the week (Q7) than those who do not.

H_{28}: People who form on-line friendships (Q19, Q21) have significantly longer sessions on the Internet (Q8) than those who do not.

Firstly, two-factor analyses of variance were conducted to investigate whether those who looked for and formed on-line friendships could be distinguished from those who did not, in terms of three indicators of their Internet usage: the number of years they had been using the Internet (their experience in using the Internet), the hours a week they spent on-line and the duration (in minutes) of their Internet session. The results showed that there was no statistically significant difference in experience in using the Internet between those who looked for on-line friends and those who did not (H_{23}). However, the effect of gender was statistically significant (see Tables 1-2 in Appendix 6.4). Tables 3-6 in Appendix 6.4 showed that those who looked for on-line friends spent significantly more hours a week on-line as well as tending to have longer Internet sessions (H_{24} and H_{25}). The effects of gender were significant. In addition, the statistically significant interaction between looking for on-line friends and gender indicated that the effect of looking for on-line friends on a respondent's hours on-line in a week, and on the duration of his or her Internet session, differed depending on the gender of the respondent (and vice versa).

There was no statistically significant difference in experience in using the Internet between those who reported that they had on-line friends and those who did not (H_{26}, Tables 7-8). However, those who had on-line friends used the Internet significantly more hours in a week and had significantly longer Internet sessions than those who did not report having on-line friends (H_{27} and H_{28}). The results of the F-tests are displayed in Appendix 6.4 (Tables 9-12).

The next analyses focused on the difference in Internet usage between those who reported having their best friend in the virtual world and those who did not. It was investigated whether those who had their best friend on-line used the Internet longer (had more experience in using the Internet), more often and had longer Internet sessions. There was a statistically significant main effect for all three measures of Internet usage. It appeared that those who had their best friend in the virtual world had used the Internet for significantly fewer years, spent significantly more hours a week on-line and had longer sessions on the Internet. Therefore, H_{26} was rejected but H_{27} and H_{28} were supported through data analysis. The results are shown in Appendix 6.4 (Table 13).

Next, the correlation coefficients were calculated between the number of on-line friends and the measures of Internet usage. The results (see Table 14 in Appendix 6.4) were statistically significant ($p<0,05$) only in the case of hours spend on-line in a week. It means that those respondent who spend more hours in a week on the Internet have significantly more on-line friends.

Next, the correlation coefficients between the measures of Internet usage and the proportion of on-line friends to all friends were calculated. The results showed (see Table 14) a statistically significant negative correlation in the case of experience in using the Internet and a statistically significant positive correlation in the case of the hours spent on-line in a week, as well as in the case of the duration of the Internet sessions. This means that the more on-line friends a respondent had in proportion to all

his or her friends, the fewer years he or she was using the Internet; the more hours on-line he or she was spending in a week; and the longer her or his sessions on the Internet tended to be.

A multiple regression model showed (see Table 15 in Appendix 6.4) that measures of the Internet usage appeared to be statistically significant predictors of the number of on-line friends one had ($p<0,05$); however, only hours on-line in a week had p-value below 0,05.

The results of the data analysis showed that the hours spent on-line in a week, as well as the duration of the Internet session, differentiated those who look for and form on-line friendships from those who do not. Therefore, there was support for the hypotheses H_{24}, H_{25} and H_{27}. Hypotheses H_{23} and H_{26} were rejected in the analysis - it appeared that there was no difference in experience in using the Internet between those who look for/form on-line friends and others. Moreover, those who had their best friend on-line were more likely to have less experience in using the Internet than those who did not report having friends on the Internet.

4.6.5. Attitudes to the Internet

The next questions focus on such factors as believing that the Internet is an appropriate tool for making friends and the motivation to use particular services on the Internet. The following hypotheses were analysed:

H_{32}: People who look for on-line friends (Q16) receive significantly higher scores on the scepticism scale (Q17) than those who do not.

H_{33}: People who form on-line friendships (Q19, Q21) have significantly higher scores on the scepticism scale (Q17) than those who do not.

H_{35}: People who look for on-line friends (Q16) form more on-line friendships (Q19, Q21) than those who do not.

H_{36}: People who look for on-line friends (Q16) spend more than 50% of their time on the Internet using social services.

H_{37}: People who spend more than 50% of their time on the Internet using social services (Q15) form more on-line friendships (Q19, Q21) than those who spend more than 50% of their time on the Internet using non-social services (Q15).

The analysis of data showed that those who looked for on-line friends were significantly more positive about the usefulness of the Internet for social contact as well, because they tended to spend significantly more time on the Internet using social tools such as chats, discussion groups and so on. Therefore, H_{32} and H_{36} were supported through the data analyses. Tables 1-4 in Appendix 6.5 show the detailed data.

Next, two-factor analysis of variance was used to calculate the difference in the number of on-line friends between those who reported that they search the virtual world in hope of finding friendship and those who did not report that they do so (H_{35}). The results (see Tables 11-12 in Appendix 6.5) turned out to be statistically significant. Those who looked for friends on the Internet had on average more on-line friends than others.

The succeeding step in the data analysis was to check by two-factor analysis of variance the difference in both scepticism about the Internet and motivation to use the Internet between those who formed on-line friendships and those who did not (H_{33} and H_{37}). There was a statistically significant main effect for both variables. It was shown that those who had on-line friends were significantly less sceptical and that they tended to be socially-oriented rather than task-oriented Internet users (see Tables 5-10 in Appendix 6.5). The results were the same when the difference in the level of scepticism and motivation to use the Internet was investigated for those who had their best friend on-line and those who did not. Therefore, the data analyses supported H_{33} and H_{37}. The calculations are shown in Table 13 in Appendix 6.5.

It is possible that there is a significant relationship between such characteristics as social orientation while using the Internet, one's attitude to the capacity of the Internet to help one make friends (scepticism) and the number of on-line friends one has (H_{33} and H_{37}). The calculations of correlation were statistically significant in both cases. This means that those who used social services on the Internet and those who believed that the Internet was the right place for developing social contacts were more likely to have on-line friends than others (Table 14 in Appendix 6.5).

The next step in the analysis of data was to calculate the correlation between both scepticism and the proportion of on-line friends to all friends, as well as between motivation to use the Internet and the proportion of on-line friends to all friends (H_{33} and H_{37}). The results (see Table 14 in Appendix 6.5) appeared to be statistically significant, which means that if one had more on-line friends in proportion to all friends, one tended to be less sceptical and more likely to use social tools on the Internet.

The results of simple regression analysis also showed that such characteristics as respondents' attitude to the Internet's usefulness for developing social contacts as well as their using social services on the Internet were statistically significant predictors of the number of friends one had in the virtual world (H_{33} and H_{37}). Table 15, presented in Appendix 6.5, shows the details.

The data analysis showed that one's attitude to the capacity of the Internet to help one make friends (scepticism) and using social tools on the Internet both appeared to be significantly related to looking for and building on-line friendships. Therefore, all examined hypotheses (H_{32}, H_{33}, H_{35}, H_{36} and H_{37}) were supported through the data analyses.

4.7. Individual differences – the quality of on-line friendship

The subsequent phase of the research focuses on the factors that are of importance for the development of friendships (on-line as well as off-line). The central question is:

- What factors are important for the development of on-line friendships?

In order to establish an answer to this question, several analyses were carried out. Firstly, to evaluate the relation between the quality of friendship and individual differences (psychological, social, demographic and other characteristics connected with the use of the Internet) correlation coefficients were calculated. Secondly, in order to check the predictive value of the above mentioned factors for the quality of friendships, simple or multivariate regression analyses were performed. Thirdly, in order to evaluate the effect of gender on the quality of friendships, analyses of variance were performed. All the above analyses were made for on-line friendship as well as, for the purposes of comparison, for off-line friendship. The aim was to show the difference/similarity in the strength of influence of different factors, such as the psychological, social or demographic characteristics of individuals, on the quality of on-line/off-line friendships. The aggregate scores on the On-line Relationship Scales for the three categories of friendships: *all on-line, the best off-line* or *the best on-line* were used to measure the quality/development of friendships.

4.7.1. Psychological factors

The first three hypotheses investigated the influence of psychological traits.

H_4: There is a significant relationship between the scores derived from the shyness/ sociability scale (for shyness) (items from Q9) and the On-line Relationships Scales (Q22 and Q25).

H_7: There is a significant relationship between the scores derived from the shyness/ sociability scale (for sociability) (Q9) and the On-line Relationships Scales (Q22, Q25).

H_{10}: There is a significant relationship between the scores on the extroversion/ introversion scale (Q10) and the On-line Relationships Scales (Q22, Q25).

The calculations of the correlation coefficients showed that variables such as sociability, extroversion or shyness were significant factors for the development of off-line friendship but they were not statistically significant for the development of on-line friendship. It appeared that there was a positive correlation between the quality of *the best off-line friendship* (aggregate score on the On-line Relationship Scales for the category *best off-line friendship*) and the level of sociability and extroversion and that there was a negative correlation between the quality of *the best off-line friendship* and the level of shyness. Table 1 in Appendix 7 shows the details.

In order to examine the effects of all psychological traits simultaneously, a multiple regression analysis was performed. When development of off-line friendship was the explained variable the model turned to be statistically significant; however, none of the predictors reached statistical significance. Therefore, in order to improve the model, stepwise regression was performed. It appeared that if shyness was removed from the model both the remaining factors reached statistical significance (see Tables 2-3 in Appendix 7).

The next step was to repeat the same procedure in order to explain the development of on-line friendship. A multiple regression model did not reach statistical significance; however, sociability appeared to be a significant predictor. The performance of stepwise regression showed that the removal of extroversion improved the model. It appeared that shyness and sociability were statistically significant predictors of the development of on-line friendship, with both influencing the quality of on-line relationships in the same direction. This means that the lower the level of both shyness and sociability, the better the quality of on-line friendships (the higher the aggregate score on the On-line Relationship Scales for the category *all on-line friendship*). The calculations are shown in Tables 4-5 in Appendix 7.

The next step in the process of data analysis was to evaluate the predictive value of gender for each independent variable (shyness, sociability and extroversion) and the effect of gender and each independent variable on the quality of both on-line and off-line friendships. The results were not statistically significant in the case of on-line friendships, but in the case of off-line friendships the results appeared to be statistically significant. The calculations showed that shyness, sociability and extroversion were statistically significant predictors of the quality of off-line friendships. The significant interaction between gender and shyness indicated that the influence of shyness on the quality of off-line friendships was modified by gender. The results are presented in Appendix 7 (Tables 6-11).

Hypotheses H_4 and H_7 received only partial support from the results of the data analysis. Calculation of correlation, multiple regression and analysis of variance did not show a relationship between development of on-line friendships and the level of psychological characteristics. Only the stepwise regression model showed that both shyness and sociability were significant predictors of the quality of on-line relationships. There was no relationship found between development of on-line friendships and the level of extroversion (H_{10} was rejected).

4.7.2. Social factors

The following hypotheses were also to be analysed in the research:

H_{13}: There is a significant relationship between the scores on the On-line Relationships Scales (Q22, Q25) and the loneliness scale (Q11).

H_{18}: There is a significant relationship between the scores on the On-line Relationships Scales (Q22, Q25) and the social support scale (Q12).

The subsequent step in the data analysis was to calculate the correlations between the social characteristics of respondents and the level of development of on-line, as well as off-line, intimate relationships. In the case of off-line friendships the results were statistically significant for all three measures of social characteristics: loneliness,

social support and social support from friends. However, when the quality of on-line friendships was concerned, the results turned out to be significant only in the case of social support and social support from friends (see Table 12 in Appendix 7). This means that there was no significant relationship between the quality of on-line friendships and the level of loneliness. However, there was a significant positive correlation between the development of on-line friendships and social support.

Some respondents regarded their on-line friendship as their most important intimate personal relationship. It is worth exploring whether the relationships between social characteristics of respondents and the quality of on-line friendships happened to change if the quality of *the best on-line friendship* was analysed. Indeed, in this case the results (see Table 12) revealed a strong statistically significant negative correlation between loneliness and the quality of on-line friendship (r=-0,69; p<0,05) and a strong positive correlation for social support from friends (r=0,86; p<0,05).

In order to check whether the quality of both on-line and off-line friendships can be used to predict the level of loneliness and social support from friends, simple regression analyses were performed. The results indicated that the quality of both off-line and *the best on-line friendships* appeared to be significant predictors of the level of loneliness (Table 13 in Appendix 7). However, the quality of *all on-line friendships* was not a statistically significant predictor (p>0,05). The level of social support from friends can be predicted from the quality of on-line friendships (*all on-line* and *the best on-line*) as well as from that of off-line friendships (Table 14). It is also worth paying attention to the R^2 statistic in order to see how much of the variance in social characteristics can be explained by the quality of friendships. The results showed that almost 50% of the variance of loneliness and almost 75% of the variance of social support from friends could be explained by the quality of *the best on-line friendship*. The quality of *the best off-line friendship* explained 8% of the variance of loneliness and 30% of the variance of social support from friends. Almost 12% of the variance of social support from friends can be explained by the quality of *all on-line friendships*. The results are presented in Tables 13-14 in Appendix 7.

Hypothesis H_{13} received at least partial support from the results of the data analysis. It appeared that there is a statistically significant relationship between the development of *best on-line friendship* and the level of loneliness but that there is no relationship between development of *all on-line friendships* and the level of loneliness. Hypothesis H_{18} was supported through data analysis.

4.7.3. Demographic factors - gender differences

The following hypothesis focuses on the gender differences in the quality of friendships:

H_{21}: Women score significantly higher than men (Q3) on the On-line relationships Scales (Q22, Q25).

The F-test was used to check the difference between the quality of the friendships of men and women (on-line as well as off-line). The results showed a statistically significant difference in the case of off-line friendships but not in the case of on-line relationships. That is, women's off-line friendships were significantly better developed than men's off-line friendships. Therefore H_{21} has to be rejected. Table 15 in Appendix 7 shows the results.

In order to see how gender influences the development of friendship analyses of variance and the regression analyses were performed for each of the seven subscales of the On-line Relationship Scales (H_{21}). The results showed that gender was not a statistically significant predictor of the development of any of the seven subscales in the case of on-line friendship. The influence of gender on the development of off-line friendship appeared to be statistically significant only in the case of the interdependence and depth scales. It was not statistically significant in the case of the rest of the subscales. The results are shown in Appendix 8.

4.7.4. Internet usage

The succeeding analysis focuses on the influence of Internet usage on the development of on-line friendships.

> H_{29}: There is a positive relationship between the amount of experience with the Internet (years/months) (Q6) and the score on the On-line Relationships Scales (Q22, Q25).
>
> H_{30}: There is a positive relationship between the number of hours a week spent on-line (Q7) and the score on the On-line Relationships Scales (Q22, Q25).
>
> H_{31}: There is a positive relationship between the average duration (minutes/hours) of an Internet session (Q8) and the score on the On-line Relationships Scales (Q22, Q25).

Only in the case of experience in using the Internet did the correlation coefficient appear to be statistically significant (see Table 16 in Appendix 7). The more years one has been using the Internet, the less developed his or her on-line relationship tends to be. The results showed that H_{29} has to be rejected – there was no positive relationship between the number of years one has been using the Internet and the quality of his or her on-line friendship; rather, there was a negative relationship.

Next, in order to examine the effects of all predicting variables simultaneously, a multiple regression analysis was performed. The results (Table 17) showed that only experience in using the Internet could be used to predict the quality of on-line friendship ($p<0,05$).

Because the previous results showed a statistically significant difference between males and females in their Internet usage, the following analyses focused on the influence of the interaction of gender and Internet usage on the development of on-line friendship. The results of that analysis, which is presented in Tables 18-20 in Appendix 7, also did not turn out to be statistically significant. Therefore, all three examined hypotheses (H_{29}, H_{30} and H_{31}) have to be rejected.

4.7.5. Attitudes to the Internet

The subsequent hypotheses focus on such factors as scepticism or motivation to use social services on the Internet.

H_{34}: There is a significant positive correlation between the scepticism scale (Q17) and the On-line Relationships Scales (Q22, Q25).

H_{38}: The On-line Relationships Scales show statistically significant differences in scores (Q22, Q25) between users who spend more than 50% of their time on the Internet using social services (Q15) and users who use non-social services for more than 50% of their time on the Internet (Q15).

The means of the On-line Relationship Scales did not prove to be significantly correlated either with scepticism or with the motivation to use the Internet. Although the multiple regression model proved to be statistically significant, none of the factors reached statistical significance. Tables 21-22 displayed in Appendix 7 show the details.

The next step was to analyse how gender, independent variables (i.e. social orientation and scepticism) and the interaction of gender and the independent variable influence the development of on-line friendship. The analysis of variance showed that none of the analysed factors (gender, scepticism and the interaction of gender and scepticism as well as gender, social orientation and the interaction of these factors) were statistically significant predictors of the development of on-line friendship. Although scepticism and motivation to use the Internet influenced the development of on-line friendship in the hypothesised direction the results were not statistically significant. Therefore both H_{34} and H_{38} have to be rejected. The results are shown in Tables 23-24 in Appendix 7.

4.8. Summary

The purpose of the research was to gather information about the prevalence and quality of on-line personal relationships, to investigate what individual characteristics differentiate those who look for and form on-line friendships from those who do not, as well as to discover the factors which are of importance for the development of on-line friendship.

First of all, it was found that although almost 50% of the Internet users reported that they formed at least one on-line friendship, the majority of personal relationships were classified as off-line.

Off-line and on-line personal relationships were compared in terms of their duration and development. The results revealed that off-line friendships lasted significantly longer than comparable on-line friendships. In addition, several different analyses showed that off-line friendships were better developed than on-line friendships. However, it is worth paying attention to the fact that there was only a minor, or even no difference between the quality of *the best off-line* and *best on-line* friendship*s*.

Almost 33% of respondents reported that they looked for friends in the virtual world and almost 50% reported that they had on-line personal relationship(s). For more than 10% of respondents their on-line friend was their best friend. The first group of hypotheses concerned differences in psychological characteristics between those who looked for and formed personal relationships on-line and those who did not. It was found that psychological characteristics rarely differentiated the two groups. However, some support was found for the assumption that the Internet is a safe place for building personal relationships, especially for shy and less sociable individuals. In addition, it was found that psychological factors were not likely to be significant predictors of the quality of on-line friendship.

The next group of hypotheses and research questions focused on social characteristics. The results showed that both loneliness and social support were significant factors that differentiated those who looked for and formed on-line friendships from those who did not. As far as the quality of on-line friendship is concerned, social support proved to be the most important variable.

The third group of factors focused on demographic characteristics of respondents. It was found that neither gender nor age differentiated those who looked for and formed on-line personal relationship from those who did not. A significant effect was found only when the respondents had a regular partner. In addition, the results showed that demographic characteristics of respondents were not significant factors in the development of on-line friendships.

The last group of hypotheses focused on Internet usage and attitudes to the Internet. The results showed that the above mentioned characteristics of respondents were significant factors that differentiated those who looked for and formed personal relationships on-line from those who did not. However, neither Internet usage nor attitudes to the Internet were likely to be related to the quality of on-line personal relationships.

Chapter 5

Discussion

The purpose of this study was to investigate the formation and development of on-line friendships, and specifically to explore the following research questions:

- How prevalent are on-line friendships among young Internet users?
- Are there differences in quality between on-line and face to face friendships?
- What kinds of individual differences (demographic, psychological and social characteristics) are related to looking for on-line friendship?
- What factors differentiate people who have started personal relationships on-line from those who have not?
- What factors are important for the development of on-line friendships?

5.1. The prevalence of on-line personal relationships

The first research questions concerned the prevalence of on-line personal relationships:

R_1: What is the frequency (n; %) of Internet users with on-line friends in the population from which the sample was drawn?

R_2: What is the distribution of on-line friendships in the population from which the sample was drawn?

The first important finding was that on-line friendships were common among young Internet users. Almost half of the sample reported having on-line friends and about 10% of the respondents considered their on-line friendship as the best and the most important of their personal relationships.

While comparing these results to other research findings the character of the sample should be taken into account. In the past, other researchers recruited survey

participants in two ways - either from the users of the specific Internet services, for example MOOs users (Parks & Roberts, 1998), MUDs users (Utz, 2000), and Newsgroups users (Parks & Floyd, 1996). Alternatively, they surveyed any Internet users regardless of which Internet services they had been using (Katz & Aspden, 1997; Knox et al., 2001). Generally, the prevalence of on-line friendship was higher among users of a particular Internet service (e.g. MUD or Newsgroup) than among any general Internet users. For example, Katz and Aspden (1997) found that 14% of their sample established friendships via the Internet. About 15% of Knox et al.'s (2001) study participants, who were college students, established an on-line personal relationship (60% of them met somebody on-line and 25,7% of those became friends). In comparison, as much as 93,6% of MOOs users (Parks & Roberts, 1998) and 60,7% of Newsgroups participants (Parks & Floyd, 1996) reported having on-line friend(s).

The sample examined in this research consisted mainly of students who regularly use the Internet. Almost half of them reported having friend(s) in the virtual world. This finding implies that on-line friendship is a very popular type of relationship among young Internet users and that the Internet is "simply another place where people meet and get to know one another" (Parks & Roberts, 1998, Discussion, para. 18). Therefore the results of the current study are consistent with the results obtained in other countries. Because the respondents of this research are mainly 19-26 year old students, the next question that arises concerns the prevalence of on-line friendship among different samples, for example in the workplace. It is worth investigating whether the Internet is also a place for older people to make friends.

5.2.   The quality of on-line personal relationships

Another important hypothesis examined in this research concerns the quality of on-line personal relationships:

> H_1: The scores on the On-line Relationships Scales show a higher degree of development for off-line friendships than for on-line friendships.

This hypothesis received at least partial support. That is, on-line friendships tended to be less developed than off-line friendships. However, the results are not the same for the different categories of on-line friendship distinguished in this study. It is interesting to note that the differences in the quality of relationships were minor or even absent when *the best on-line* and *the best off-line friendships* were compared.

Three methods were used to investigate the quality (development) of on-line friendships. Firstly, the duration of such friendships was assessed. Secondly, in order to see the absolute level of development of different categories of off-line and on-line relationships, the means and theoretical midpoints of the On-line Relationships Scales were compared. And finally, the means of subscales of On-line Relationships Scales for different categories of on-line and off-line friendships were compared.

5.2.1. Duration of friendships

The results showed that off-line friendships last much longer than on-line friendships. The average duration of on-line friendship was less than one year while off-line friendship lasted more than 7 years. This finding is in line with the research of Parks and Roberts (1998) and Parks and Floyd (1996). They also found that the typical on-line relationship had a duration of just over a year or less than a year, respectively. It was considered important to explore whether such a short duration of on-line friendship in comparison to off-line friendship was merely a function of the number of years one has been using the Internet or whether it was the result of the nature of on-line relations, which tend not to be stable. This last statement is not in line with the results of McKenna et al.'s (2002) study, in which they revealed that on-line relationships remained relatively stable and durable over the 2-year period and that "the stability of relationships initially developed on-line compares favourably to that found in studies of relationships that had initially developed face to face" (Study 2, Results and Discussion, para. 3).

5.2.2. Absolute level of development of personal relationships

The absolute level of the development of personal relationships was measured for four categories of friendship distinguished in this study. Firstly, the absolute level of development of three categories of on-line friendships was measured: *the best on-line, on-line* and *all on-line* (best on-line plus on-line). Secondly, for the purpose of comparison one category of off-line friendship - *the best off-line* - was assessed.

Both *the best on-line* and *the best off-line friendships* were rated significantly above the midpoints of the scales measuring interdependence, depth, breadth, commitment, predictability /understanding and code change (see chapter 3, section 3.3.4 for the definitions of scales). The only exception was the network convergence scale, which measures how the participants introduce one another to each other's friends and family and develop a common social circle.

The assessment of the quality of *all on-line friendships* also showed that only in the case of the network convergence subscale was relational development rated below the theoretical midpoint of the scale. The low score on the network convergence subscale for on-line relationships may be the result of the geographic distance between the Internet friends. It is possible that on-line friends have little or no opportunity to introduce their partners to their off-line friends and family.

The assessment of the quality of *the best on-line* and *all on-line friendships* is consistent with Parks and Roberts' (1998) results. Their findings also revealed that on-line friendships were rated significantly above all midpoints of the On-line Relationships Scales, except for the network convergence subscale.

The category *on-line friendship* was not rated as high as *the best on-line, all on-line* and *the best off-line friendships*. Both the network convergence and interdependence subscales were rated below the theoretical midpoints of the scales. The observed means of the two other subscales, namely code change and predictability/

understanding, fell on the theoretical midpoints of the scales. The last three dimensions of relationship development, the breadth, depth and commitment subscales, were rated above the midpoints of the scales.

These findings are in line with Parks and Floyd's (1996) results. They revealed that on-line friendships are rated above the theoretical midpoints of the breadth and depth subscales and below the theoretical midpoints of the code change and network convergence subscales. The totals for the items assessing depth produced a mean nearly four points higher than the theoretical midpoint of the scale and the mean of the network scale was more than 5 points below the theoretical midpoint of the scale.

In summary, it is worth noticing that network convergence generally was not extensive in on-line relationships. Only in the case of network convergence was the observed mean always below the theoretical midpoint of the scale. On the other hand, on-line relationships tended to achieve high scores especially on the depth, breadth and commitment dimensions (see Appendix 5). While looking at the research results, a question arises concerning the difference between the quality of friendships examined by Parks and Roberts (1998) and Parks and Floyd (1996). The reason for this discrepancy in research results can be found in the differences between different types of settings or virtual environments, e.g. MOOs, newsgroups or the Internet in general. MOOs are synchronous and more social than asynchronous newsgroups. As Parks and Roberts (1998) stated "MOOs provide an extensible and dynamic social environment in contrast to the static environment provided by newsgroups (…). MOOs provide for rich, multi-layered social interaction through the capacity to emote, direct speech and engage in multiple conversations simultaneously" (Discussion, para. 10).

5.2.3. Comparison of the quality of on-line and off-line friendships

The comparison of aggregate scores on the On-line Relationships Scales for on-line and off-line friendships revealed that on-line friendships tended to be significantly less developed than off-line ones. However, it is worth noticing that when the quality of

the best on-line friendships was compared to the quality of *the best off-line friendships* the difference was statistically significant but very small (slightly more than one point). These results are congruent with Parks and Roberts' (1998) findings, which showed that although off-line relationships were generally of better quality overall, the differences were substantively small on several dimensions of relationship development.

In order to see more details regarding differences in the development of friendships in different settings (the real world and virtual reality), on-line and off-line personal relationships were compared in terms of seven dimensions of relationship development. The comparison of the development of *the best off-line* and *the best on-line friendships* showed that only in the case of the network convergence and predictability/understanding subscales were off-line friendships better developed than on-line friendships. The difference in the case of the predictability/understanding subscale was substantively small (the score for *the best off-line* was 1,5 points higher than the score for *the best on-line friendships*) but it was large (more than six points) in the case of the network subscale. Another interesting result was that on-line and off-line friendships did not differ especially in the level of breadth, depth, code change and commitment (less than one point). This is in line with Parks and Roberts' (1998) findings, which revealed that there were no differences between MOO and off-line relationships in terms of the breadth, depth and code change subscales and that the difference in commitment was at the edge of significance. The difference between MOO and off-line relationships in terms of off-line network convergence reached more than eight points (the score on the Network convergence subscale of On-line Relationships Scales was eight points higher for off-line relationship than for MOO relationship).

Although off-line friendships were significantly better developed than on-line friendships overall, it is worth noticing that breadth, depth and commitment dimensions of on-line relationships received highest scores while network convergence and interdependence dimensions received the lowest scores.

While one is looking at the research results the question arises why in virtual reality some dimensions of relationships are well developed and others are underdeveloped. The answer is easy in the case of the network convergence subscale, as it has been already mentioned that the geographical distance may be the reason, but it is not so straightforward for the other dimensions of relational development of friendships.

The items on the commitment scale are designed to measure the importance of a relationship to the participants. The respondents of the present study rated their on-line friendships equal to off-line friendships in terms of commitment when it was the most important relationship for them (*the best on-line*). The commitment level of all on-line friendships was rated above the theoretical midpoint. The high scores on the commitment subscale contradict the results of Cornwell and Lundgren's (2001) study, who examined the level of involvement and misrepresentation in romantic relationships in cyberspace and in off-line settings. They found that commitment tended to be lower in on-line relationships than in off-line relationships. The reason for the discrepancy in the research results could be seen in the difference in significance of commitment in romantic and non-romantic intimate personal relationships. Parks and Floyd (1996) reported moderate levels of commitment in their sample. The difference in the level of commitment between off-line and on-line relationships evaluated by Parks and Robert's (1998) study participants was statistically significant but substantively small (the mean for this dimension for off-line friendships was 1,63 point higher than the mean for on-line friendships). These findings suggest that the commitment dimension of personal relationships could be highly developed regardless of the settings of the interaction (on-line or off-line).

It is worth noting the difference in the scores on the interdependence scale between *the best on-line friendships* and *on-line friendships*. If the respondents consider their on-line relationship as the most important of all their relationships (*the best on-line friendships*), the scores on the interdependence dimension were equal to the scores

achieved by *the best off-line friendships*. However, if the relationship was not as important (*on-line friendships*) the interdependence dimension was rated even below the midpoint of the scale. The respondents of Parks and Roberts's (1998) study were also asked to choose the best of their on-line relationships (MOOs relationships) and they also rated the interdependence dimension significantly below the interdependence dimension of comparable off-line relationships. These findings suggested that interdependence between participants in the relationship is more a function of the subjective importance of the relation between the partners than the settings (the virtual or real world).

The items of the predictability/understanding scale are designed to measure how well partners know each other. The scale measures the degree of certainty, prediction and understanding between the partners. The characteristics of the virtual world, such as physical distance and anonymity could inhibit the process of getting to know each other. Partners do not have the opportunity to observe each other's behaviours as in the real world. They usually have to depend on a written text and they do not usually see how the partner behaves, for example, in a stressful situation. This is in line with the Social Presence model and Reduced Social Cues approach, which state that the development of an intimate personal relationship is inhibited when there are no social cues in the environment.

The best developed dimensions of on-line friendship are breadth and depth of relationship. As the relationship develops the variety of conversation topics and shared activities increases. Participants tend to reveal more important, risky and personal information. The depth scale measures intimacy and self-disclosure. The anonymity and security of the virtual world makes it easier to disclose inner feelings, worries and emotions. This is consistent with McKenna and Bargh's (2000) theory, in which they stated that, "the relative anonymity of Internet communication may allow individuals to take greater risks in making disclosures to their Internet friends than they would with someone they met in a more traditional, non-anonymous setting" (Positive effects of anonymity, para. 3). The development of breadth and depth in on-line friendships is

also in line with Parks and Roberts' (1998) findings, as well as with the hyperpersonal effects in computer-mediated communication predicted in Walther's (1996) theory. Roberts, Smith, & Pollock's (1996, as cited in Parks & Roberts, 1998) also found that MOO relationships were characterised as intense and involving high rates of self-disclosures.

According to Parks and Floyd (1996), code change measures how participants develop specialised ways of communicating, such as personal idioms that allow them to express themselves in more efficient ways. Depending on the category of on-line friendships (*on-line* or *the best on-line*), moderate to high levels of code change respectively were reported by the participants of this study. Parks and Roberts' (1998) respondents rated their on-line friendships (MOOs) very high on this dimension. On the other hand on-line relationships (Newsgroups) evaluated by Parks and Floyd's (1996), respondents were rated below the theoretical midpoint of the code change scale. The reason for this discrepancy in research results may be found again in the differences between different types of virtual environments. The features of MOOs may make it easier to evolve specialised ways of communicating. It is possible that those respondents who reported having their best friend on the Internet communicated with their on-line partner more often by synchronous and more social communication settings or channels than other respondents. However, this possibility was not examined in this research.

While the findings of this study suggest that on-line friendships could reach a level of development comparable to off-line friendships, only partial support for the examined hypothesis was found (H_1). On-line relationships tended to be significantly less developed than off-line relationships on the particular dimensions of the On-line Relationships Scales, such as network convergence or predictability/understanding. The fact that 10% of the people in the sample picked an on-line relationship as the most important and the best developed of their personal relationships is very promising for the Internet as a social setting. Although these relationships last significantly shorter than comparable off-line friendships, they reached the same level

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of development on most subscales of the On-line Relationships Development Scales. It is true that some characteristics of virtual reality, such as physical distance, inhibit the development of intimate personal relationships. However, there are also aspects of the Internet, such as anonymity, which make it easier for the relationship to develop.

The findings of this study suggest that the key factor in the development of friendship was the subjective importance of the relationship. Although on-line personal relationships were generally less developed than comparable off-line relationships, on-line and off-line friendships reached almost the same levels of relational development if they were considered by respondents as their most important personal relationships (*the best on-line* and *the best off-line friendships*).

The Internet can be treated as just another place for meeting new people. The cyberspace relationship could be just the initial phase of friendship. Although in this study migration to others types of relationships was not measured, the previous findings (e.g. Parks & Roberts, 1998; Parks & Floyd, 1996; McKenna et al., 2002) showed that on-line relationships tend to gradually migrate to other settings and participants tend to use other channels of communication, such as the telephone, the postal service or face to face communication. According to Parks and Floyd (1996) relationships that begin in cyberspace rarely stay there. It is worthwhile to investigate whether relationships that begin on-line are different from relationships that originate in off-line settings. It is possible, taking into account such aspects of virtual reality as greater anonymity and safety, that on-line relationships that migrate to other settings will be better developed than those friendships which stay on the Internet. This is in line with McKenna et al.'s (2002) theory, which suggests that on-line relationships should develop closeness and intimacy significantly faster than relationships that began off-line, because of "the greater ease of self-disclosure, as well as the founding of the relationship on more substantive bases, such as shared interests (as opposed to physical attractiveness alone)" (McKenna et al., 2002, Special qualities of Internet communication, para. 5). Taking into account the generally high levels of development of on-line relationships, it may be the case that "the relative ease of disclosure on-line

'pulls' perceptions of development in other dimensions. People may be more likely to attribute commitment and understanding to their relationship when they observe (as the screen makes it easy to do) their own and others' high levels of disclosure across a broad range of topics" (Parks & Roberts, 1998, Discussion, para. 8).

5.3. Individual differences

Besides examining the quality and prevalence of on-line friendships, the purpose of this study was to explore the characteristics that differentiate those who look for and form friendships in virtual reality from those who do not, as well as to find out what factors are important for the development of on-line personal relationships. Previous research findings and theories suggested that Internet usage and attitudes to the Internet as well as psychological, social and demographic characteristics may influence the looking for, formation, and development of on-line personal relationships.

5.3.1. Psychological factors

Little support was found for the first group of hypotheses regarding psychological factors. No significant differences between those who look for and form on-line friendships and those who did not were apparent for extroversion. However, the results gave some support to the hypotheses concerning differences in sociability and shyness. It appeared that male respondents who looked for friends in the virtual world were shyer than those who did not. In addition, the more on-line friends one had, in comparison to all friends, the less sociable one tended to be. The results of this study are in line with McKenna et al.'s (2000, 2002) findings, which suggested that those individuals who experience social anxiety when placed in social situations, such as meeting new people, are more likely to seek out interactions and form relationships with others on the Internet.

The following analyses concern the relationship between psychological characteristics and quality/development of on-line personal relationships. The examination of off-line

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relationships as well as more detailed statistical analyses (e.g. stepwise regression) showed that psychological characteristics affected the formation and development of on-line friendship differently from the way they did the development of off-line friendships. Firstly, psychological characteristics are more significant factors in the formation and development of friendship in an off-line context than in on-line settings. Secondly, a negative relationship was found between the general trait of sociability and the development of on-line friendships. These results are consistent with Katz and Aspden's (1997) findings. In virtual reality they "found no statistical relationships between propensity to make friends and a wide range of measures of traditional forms of social connectedness and measures of personality attributes" (The Internet is emerging as a medium for friendship creation, para. 3). The results of their survey suggested that "the Internet is a medium where Internet skills appear to be the most important determinant of friendship formation, eclipsing personality characteristics such as sociability, extroversion, and willingness to take risks" (Katz and Aspden, 1997, Pessimism for pessimistic theories, para. 3). According to them, this points to the Internet de-emphasizing the importance of personality differences. This is also consistent with the results of Hills and Argyle (2002) and Swickert et al. (2001), who found few or no relationships between the Internet usage and individual differences in personality. The importance of psychological traits for the development of on-line friendship was also examined by Utz (2000), who found that the development of friendships in MUDs is only weakly correlated with sociability. Parks and Floyd (1996) concluded their study by saying "it may be that developing personal relationships on-line is more a function of simple experience than it is of demographic or personality characteristics" (Who has on-line personal relationships? para. 4).

Because the results of the present study as well as these of many others, showed that different psychological characteristics are more important in the formation and development of on-line personal relationships than in the case of off-line friendships, it may be possible that the Internet "provides an opportunity for shy and inhibited people to overcome their difficulties" (Utz, 2000, Discussion, para. 2) and as Parks and Roberts (1998) have stated it, the Internet provides its users with "the perception of a

safe environment for social interaction in which individuals can explore all types of relationships without fear of repercussions in their physical lives" (Discussion, para. 5).

5.3.2. Social factors

Another important finding of this study concerns the relationship between social characteristics and on-line friendship formation and quality. The results showed that loneliness, social support and the number of off-line friends differentiated those who look for personal relationships on the Internet and those who do not. Those who feel alone and do not receive enough support from their friends and family are more likely than others to turn to the Internet in order to form personal relationships. However, no significant differences were found between the two groups in their local and distant social networks. These findings are congruent with McKenna and Bargh's (1999, 2000) and McKenna et al.'s (2002) suggestions that social factors are some of the most important determinants of looking for personal relationships on-line. In addition, they are also in line with the results of Hamburger and Ben-Artzi (2002), which demonstrate that lonely people are more attracted to the Internet, as well as with the results of Kraut et al. (1998), in which a negative correlation was found between looking for on-line friends and social support. Although McKenna and Bargh (1999) found that loneliness has proved to be a strong predictor for the formation of on-line friendships, other researchers (Kraut et al., 1998) did not find a relationship between loneliness and Internet use.

The hypotheses regarding the relation between the formation of on-line friendships and social characteristics received only partial support from the results of this study. No differences were found in both loneliness and social support between those who reported having on-line friends and those who did not. In addition, there were no correlations between the number of on-line friends and social characteristics (although there was a negative correlation between number of off-line friends and loneliness). However, those who reported that they had their best friend in the virtual world (the

best on-line) tended to be both more lonely and to receive less social support from their friends than those who did not report having their best friend on the Internet. Moreover, it appeared that the more on-line friends one had in comparison to all friends, the more lonely he/she felt and the less social support he/she received.

As far as the relation between the quality of friendship and social characteristics is concerned social support proves to be the most important factor. There was a strong positive correlation only between perceived social support and the quality of on-line friendship. There was no correlation between the quality of on-line friendship and loneliness. However, the quality of both the *best off-line* and *the best on-line friendships* was strongly correlated with social support and loneliness. It is worth adding that even more of the variance in social support and loneliness can be explained by the quality of *the best on-line friendships* than by *the quality of the best off-line friendships*. These results suggest that on-line relationships can be a very important source of social support and they are in line with the results of Whitty (2002) and Silverman (1999).

These results are just another voice in the discussion regarding the relationship between Internet use and social characteristics. The results, which showed that those who had their best friend on-line are more alone than others, are consistent with the conclusions arrived at by Kraut et al. (1998) and Turkle (1996, as cited in McKenna & Bargh, 2000) regarding the negative influence of Internet use on loneliness level and social involvement. However, the findings about the relation between quality of on-line friendships and social characteristics showed no support for the above mentioned assumption and they are rather more congruent with the results of Hamburger and Ben-Artzi (2002) and LaRose, Eastin, and Gregg (2001) who did not find a negative influence of Internet usage on loneliness level or social support.

5.3.3. Demographic factors

Neither gender, age nor marital status proved to be related to the formation and development of on-line personal relationships. However, the findings offer support for the hypothesis considering the relationship between having a regular partner and looking for on-line friends. They demonstrate that people who have a regular partner are less likely to look for personal relationships on the Internet. These results contradict many previous findings, in which demographic characteristics of respondents were found to be significant variables. Whitty (2002) demonstrated that age and gender do need to be considered when investigating the formation of on-line relationships. Parks and Floyd (1996) found that women were significantly more likely than men to have formed personal relationships on-line. In addition, Boneve et al. (2001) and McKenna et al. (2002) found gender differences in the formation and development of on-line personal relationships. However, the results of this study are in line with the findings of Parks and Floyd (1996), who also found no relation between both age and marital status and the likelihood of developing a personal relationship on the Internet. The reason for this discrepancy in findings may lie in the characteristics of respondents for this study, who were students, mostly of the same age (around twenty) and single. The characteristics of the respondents for this study may be also the reason why having a regular partner rather than marital status differentiated those who look for friends in the virtual world from others.

5.3.4. Internet usage

In line with previous findings (Parks & Floyd, 1996; Whitty, 2002) the results of this study offer support for the hypotheses about the relation between Internet usage and looking for, building and development of on-line friendships. It was shown that those who reported that they look for and form on-line friendships had been using the Internet significantly more hours during the week and that they have had significantly longer sessions on the Internet than others. It is interesting to note that the relation between the number of years on-line (experience in using the Internet) and formation of friendships on the Internet was absent or even negative.

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Another interesting result of this study was that the number of years on-line (experience in using the Internet) was negatively correlated with the development of on-line friendship, as well as that there was no significant relationship found between hours spent on-line in a week, the duration of the Internet session and the quality of on-line personal relationships. This suggests that those who had been using the Internet for more years tended to have even fewer on-line friends and that their on-line friendships were of lower quality than those who had been using the Internet for a shorter period of time. These findings are not in line with the Social Information Processing Theory (SIP; Walther, 1992) according to which time is a crucial element in the development of on-line friendships. They also contradict Parks and Floyd's (1996) contention that the development of friendship is a function of familiarity and experience with CMC, as well as Whitty's (2002) assumption that development of on-line personal relationships is a function of time. He found that "the more time people spend in chat rooms the more open they are about themselves" and "with time, emotional support is given and received in chat rooms" (Whitty, 2002, Discussion, para. 2). Katz and Aspden (1997) also concluded that the development of on-line friendships relate more strongly to general measures of Internet usage and experience. In their sample, "longtime users reported making more friends" (Katz & Aspden, 1997, Number of friendships formed, para. 1). In addition, Utz (2000) found that with increasing time on-line people use more paralanguage and that this increases the development of friendship. However, she also found that the "specific relationship between verbalizing relational contents and development of friendships remained, even when the data were controlled for MUD-time in months and hours per week spent in MUDs" (Utz, 2000, Discussion, para. 1). According to her "the time spent in virtual worlds may be a necessary, but not a sufficient predictor for making friends" (Utz, 2000, Discussion, para. 1). Perhaps, the question about number of years on-line, which was asked to the respondents for this study, is not a adequate measure of experience in using the Internet. It is possible that people have been using the Internet for many years but they do not have experience on the Internet. Some Internet users may use the Internet only for some specific work-related information, for example

stock market indexes. Others only continuously run a window with the Internet in the background of their computer. According to Utz (2000) it could be argued that time spent on-line is not a good measure of one's experience in using the Internet.

Taking into account the characteristics of the respondents to this survey, who were mostly students of information technology, it is possible that although they had experience on the Internet, their main reason for using the Internet was related to their study or work and that they had not gained the experience necessary for the development of on-line friendships. This assumption is in line with Utz's (2000) conclusion that "only if experience is conceived as ability to deal with the social possibilities of CMC, and the ability to verbalize emotional contents, is it a significant predictor of the development of friendships" (Discussion, para. 1) as well as with the findings that showed the relation between motivation/purpose to use the Internet and the formation and development of on-line personal relationships.

5.3.5. Attitudes to the Internet

Draft and Lengel (1984) demonstrated that attitudes about CMC affect its use. According to the SIP perspective (Walther, 1992), motivational factors are an assumed precursor to social information processing and formation of on-line personal relationships. Congruent with the past research, the current study found that scepticism about making friends via the Internet, as well as motivation to use the Internet, differentiated those who looked for and formed on-line friendships from those who did not. The same conclusion was reached by Utz (2000), who showed that "the more skeptical about CMC's friendly capacities a person is, the less s/he develops friendships" (Results, para. 4), as well as that motivation is a very important factor in the formation of on-line friendships. Utz (2000) concluded that "if people are not primarily motivated to get to know other individuals, they verbalize nonverbal communication to a lesser intent" (Discussion, para. 6), and this has a negative influence on the formation of friendship in the virtual world. It is worth noticing that no relationship was found between attitudes to the Internet and quality/development of

on-line friendships. It seems that scepticism and motivation are significant prerequisites for friendship formation in the virtual world but they are not as important in the actual process of development of on-line friendships.

In summary, the current research showed the relations between looking for, formation and development of on-line personal relationships and the psychological, social, demographic and other characteristics of respondents connected with Internet usage. It appeared that psychological characteristics, such as sociability, shyness or extroversion influence the creation of personal relationships in the virtual world differently from the way they influence the creation of friendships in off-line settings. In the off-line world people who are less shy and more sociable create more friendships. The current study showed that the situation is different in the virtual world. That is, in line with the previous findings (McKenna & Bargh, 2000; McKenna, et al., 2002), it was found that those who look for and form friendships on the Internet tend to be shyer and less sociable than others.

The analyses of connections between looking for, formation and development/quality of on-line personal relationships and social factors suggest that those who feel alone and do not get 'enough' social support are more likely to turn to the virtual world in order to find friends. In addition, the results of the current study show that having personal relationships on the Internet is not enough to meet one's social needs. However, it is interesting to note that on-line friendships can be a very important source of social support.

Perhaps because of the characteristics of the respondents in the current study, the results showed that demographic factors did not have a significant effect on the formation and development of on-line friendships. The only factor that was of importance was having a regular partner.

It appeared that those who look for and form friendships in the virtual world spend more hours on-line during a week, and also their Internet sessions tend to be longer than those of others. Surprisingly, no relationship was found between the above mentioned measures of Internet usage and the development/quality of on-line friendships. Even more surprising and unexpected were the results which suggest that those who had been using the Internet for more years tended to have even fewer on-line friends and that their on-line friendships were of lower quality than those who had been using the Internet for a shorter period of time.

Finally, it was found that those who look for and form on-line friendships are less sceptical about the possibility of making friends in the virtual world, they spend more time on the Internet using social tools, and they actually look for friends on-line. However, no relationship was found between both scepticism and motivation to use the Internet and the development/quality of on-line personal relationships.

To conclude, the primary findings of this study were that friendships are common in the virtual world and that the Internet provides a powerful social context for the creation of personal relationships. This research challenges the argument that only shallow and meaningless relationships are developed in the virtual world. Rather, it is argued here that high levels of relational development are occurring on-line.

5.4. Future research

These findings pose new challenges for an understanding of social relationships in virtual reality; therefore continued research into the dynamics of personal relationships which are formed through CMC represents an important research focus. Firstly, the question arises regarding the consequences of friendships that are formed in this environment. It would be interesting to investigate whether on-line friendships tend to replace, compensate for or complement face to face relationships. It would be also desirable in future research to examine how cyberspace relationships evolve over time. It would be interesting to find out whether relationships which were formed in

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cyberspace and then migrated to real life may be better developed than those that originated in off-line settings. Cornwell and Lundgren (2001), for example, have shown that if on-line relationships migrate into off-line settings, levels of involvement are likely to increase. McKenna and Bargh (1998) and McKenna (1999) have found that people who meet each other initially on the Internet, like one another more later on than if they had initially met each other in person. In conclusion, a wealth of interesting questions regarding on-line friendships is open to further exploration.

In addition, it would be desirable in future research to investigate more widely the characteristics of people who tend to look for and form personal relationships on the Internet. The present study can be seen as an early step in examining the differences between those people who find on-line reality as another place for meeting new people and those who do not believe that it is possible to become friends with others in the virtual world. It is important to stress that this study investigates only some selected characteristics of Internet users and that it is only one step toward a fuller understanding of friendship formation on the Internet. Future work should attempt to understand which personality traits and characteristics of people are associated with the creation and development of personal relationships on the Internet. For example, it would be desirable to examine more widely the relationship between shyness/sociability and on-line friendships.

It would also be interesting to investigate whether the same factors are of importance for the development of personal relationships in different settings (on-line and off-line) and different types of virtual environment (e.g. chats, MOOs, newsgroups). By comparing relationships across real and virtual environments it may be possible to distinguish those aspects of relationships that are attributable to the medium in general from those that are specific to the type of virtual environment. It is possible that the level of the relational development of friendships tends to be different in different social venues of the Internet and that the specific characteristics of some types of virtual environment, e.g. the possibility of synchronous communications, are of importance for the development of relationships.

5.5.   Possible limitations

While this study addresses some very important questions regarding on-line friendships, there are some limitations of it that should be considered.

A possible limitation of this investigation is related to the narrow demographics of the sample. The majority of participants were students and most of them were young and single. Thus it can be argued that they do not represent typical Internet users. However, by taking into account that surveys have indicated that the Internet is used mostly by young, well-educated people (Rynki, n.d.), it can be assumed that students are representative of a large portion of the Internet community.

Next, because the sample was self-selected, the question whether participants and non-participants differ in important characteristics is also significant. The high standard deviations in measurement of Internet usage indicate that a broad range of Internet users participated in the current study.

In addition, it should be noted that using this particular sample of young college students might cause one to overestimate the percentage of people who form on-line friendships. The majority of the survey respondents were in their late adolescence or early adulthood (mean for age is 22,3 years), "a developmental stage where individuals typically have the greatest number of friends, and engage in frequent social interactions" (Parks & Roberts, 1998, Discussion, para. 16).

Therefore, because other populations may yield different results, future research should investigate the prevalence and the quality of on-line friendships among the wider Internet-user populations. The researchers should attempt to survey a more representative sample that includes both college students as well as typical adults.

Another limitation of this study is that data are self-reported. Therefore, the assessment may be somewhat biased owing to, for example, memory errors. However,

according to social cognitive theory, it is the perception of behaviour rather than the actual behaviour that matters (Bandura, 1986, as cited in LaRose et al., 2001), and this is consistent with research comparing self-reports of computer systems activity with electronic log data (Deane, Podd, & Henderson, 1998). Nevertheless, in addressing this limitation, some variables such as Internet usage could be measured by a behavioural measure (e.g., a computer programme that records time spent on-line).

It should also be added that some observers may question the authenticity of data collected on-line. However, according to Parks and Roberts (1998) there is some evidence that the quality of data obtained in on-line surveys may equal or even surpass that of off-line surveys. Researchers (e.g. Reips, 1996; Smith & Leigh, 1997, as cited in Parks & Roberts, 1998) have shown that the nature of on-line research increases both respondents' and researchers' anonymity and decreases experimenter bias. As Parks and Roberts (1998) point out: "researchers comparing computer administered and paper-and-pencil surveys have reported similar responses on non-aptitude psychological measures (Rossenfeld et al., 1993), increased self-disclosure (Weisband & Kiesler, 1996), and lessened social desirability responding (Kiesler & Sproull, 1986) in computer administered surveys" (Discussion, para. 13).

To conclude, while this study has several limitations that need to be addressed in future work, it nevertheless makes an important contribution to an understanding of the formation and development of on-line personal relationships.

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Appendix 1

The prevalence of friendships
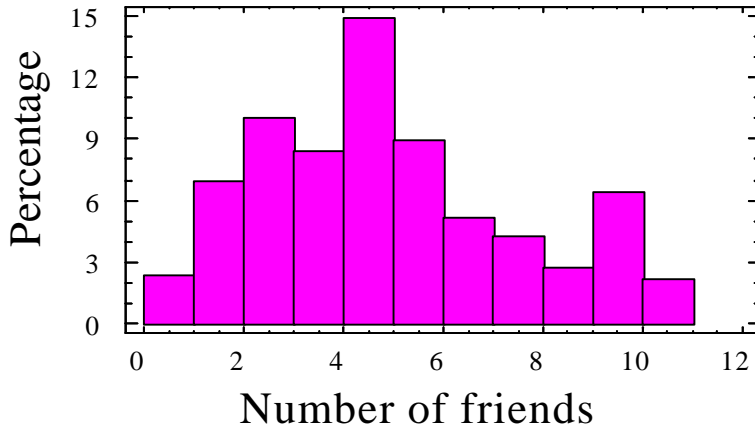
Figure 1: Percentage distribution for the number of friends
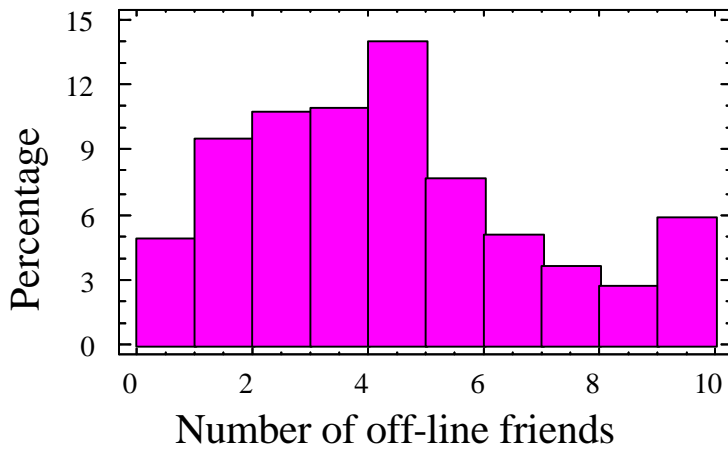
Figure 2: Percentage distribution for the number of off-line friends
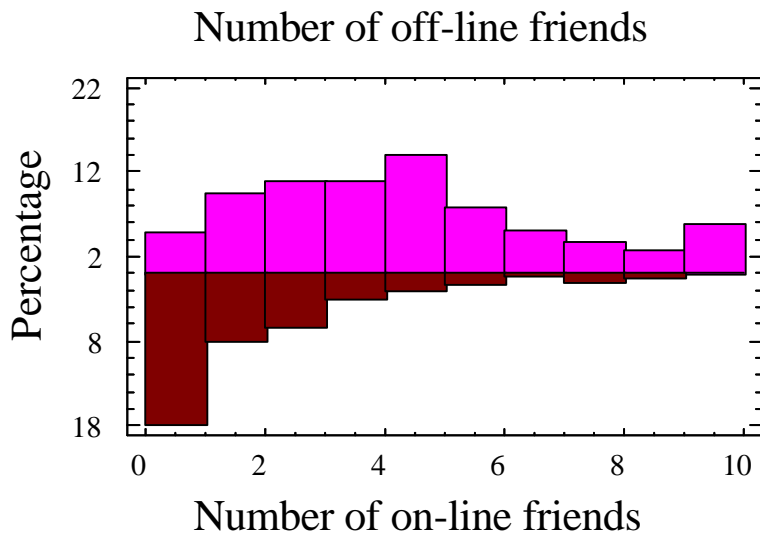
Figure 3: Percentage distribution for the number of off-line friends and the number of on-line friends

Table 1: T-test to compare means of prevalence of off-line and on-line friendships

t	p	Mean number of off-line friends	Mean number of on-line friends
10,14	0,000	9,03	1,97

Table 2: Descriptive statistics for the number of friends in different types of friendship (on-line and off-line)

	Mean	SD	Min	Max	Sum	%	N
a	5,38	11,43	0	100	2996	49,46	557
b	3,24	6,16	0	70	1805	29,80	557
c	0,41	1,80	0	20	230	3,80	557
d	0,46	2,13	0	380	238	3,93	521
e	0,61	1,86	0	200	319	5,27	521
f	0,90	2,76	0	260	470	7,76	521

Table 3: One-way analysis of variance - prevalence of different types of friendships

F	d.f.	p
71,30	5; 3228	0,000

Table 4: Multiple Range Tests - prevalence of different types of friendships

	b	c	d	e	f
a	*2,14	*4,97	*4,92	*4,77	*4,48
b		*2,83	*2,78	*2,63	*2,34
c			-0,04	-0,20	-0,50
d				-0,16	-0,45
e					-0,29

* denotes a statistically significant difference

Table 5: Variance check and non-parametric test - prevalence of different types of friendships

Levene's test		Kruskall-Wallis Test	
F	p	t	p
51,02	0,000	1110,60	0,000

Appendix 2

Duration of friendships

Table 1: One-way analysis of variance - duration of different categories of friendships

F	d.f.	p
65,38	4; 1028	0,000

Table 2: Multiple Range Tests - duration of different categories of friendships

Categories of friendship	all on-line	best on-line	best off-line	on-line
the best	*52,12	*58,26	*-9,07	*51,97
all on-line		6,14	*-61,19	*-67,33
best on-line			*-67,33	-6,29
best off-line				*61,04

* denotes a statistically significant difference

Table 3: Variance check and non-parametric test - duration of different categories of friendships

Levene's test		Kruskall-Wallis Test	
F	p	t	p
32,92	0,000	305,45	0,000

Table 4: T-test to compare means of duration of best off-line and best on-line friendships

Variance test		t	p	best off-line	best on-line
F	p				
7,27	0,000	13,30	0,000	84,78	17,44

Table 5: T-test to compare means of duration of best on-line and on-line friendships

Variance test		t	p	best on-line	on-line
F	p	-1,39	0,0837	17,45	23,7
0,5661	0,046				

Appendix 3

Comparison of the midpoints and means of the On-Line Relationship Scales for different categories of friendships

Table 1: Best off-line friendships
Number of cases - 320

Developmental dimension (subscales)	Scale midpoint	Observed mean	Observed SD	Single sample t-test (one-tailed) / p-value	Number of values above midpoint	Explanation
Interdependence	16	21,47	4,21	23,20 /0,000	281	above
Breadth	8	11,84	2,19	31,37 /0,000	283	above
Depth	16	24,71	3,51	44,35 /0,000	305	above
Code change	12	14,68	4,59	10,47 /0,000	213	above
Predictability/ Understanding	12	17,07	3,18	28,41 /0,000	283	above
Commitment	12	17,69	3,43	29,69 /0,000	291	above
Network	12	17,18	3,57	25,96 /0,000	280	above

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Table 2: On-line friendships
Number of cases - 138

Developmental dimension (subscales)	Scale midpoint	Observed mean	Observed SD	Single sample t-test (one-tailed) / p-value	Number of values above midpoint	Explanation
Interdependence	16	14,61	5,81	-2,81 /0,003	46	below
Breadth	8	9,71	2,98	6,75 /0,000	76	above
Depth	16	19,63	6,12	6,97 /0,000	90	above
Code change	12	12,64	5,12	1,48 /0,071	67	equal
Predictability/ Understanding	12	12,22	4,84	0,55 /0,293	59	equal
Commitment	12	13,73	4,07	5,00 /0,000	77	above
Network	12	9,79	5,31	-4,89 /0,000	42	below

Table 3: Best on-line friendships
Number of cases - 38

Developmental dimension (subscales)	Scale midpoint	Observed mean	Observed SD	Single sample t-test (one-tailed) / p-value	Number of values above midpoint	Explanation
Interdependence	16	20,39	4,48	6,05 /0,000	29	above
Breadth	8	11,53	2,76	7,88 /0,000	31	above
Depth	16	24,18	4,67	10,80 /0,000	33	above
Code change	12	14,5	4,2	3,67 /0,000	25	above
Predictability/ Understanding	12	15,63	4,33	5,17 /0,000	30	above
Commitment	12	17,92	3,46	10,55 /0,000	33	above
Network	12	11,87	5,64	-0,14 /0,443	18	above

Table 4: All on-line friendships
Number of cases – 167

Developmental dimension (subscales)	Scale midpoint	Observed mean	Observed SD	Single sample t-test (one-tailed) / p-value	Number of values above midpoint	Explanation
Interdependence	16	15,68	6,08	-0,69 /0,247	70	equal
Breadth	8	10,11	3,02	9,05 /0,000	102	above
Depth	16	20,44	6,18	9,3 /0,000	115	above
Code change	12	13,10	5,08	2,79 /0,003	88	above
Predictability/ Understanding	12	12,90	5,01	2,32 /0,011	83	above
Commitment	12	14,59	4,32	7,75 /0,000	104	above
Network	12	10,37	5,44	-3,87 /0,000	58	below

Table 5: Best friendships

Number of cases – 376

Developmental dimension (subscales)	Scale midpoint	Observed mean	Observed SD	Single sample t-test (one-tailed) / p-value	Number of values above midpoint	Explanation
Interdependence	16	21,27	4,26	23,96 /0,000	323	above
Breadth	8	11,76	2,28	31,90 /0,000	326	above
Depth	16	24,54	3,75	44,13 /0,000	352	above
Code change	12	14,68	4,56	11,39 /0,000	249	above
Predictability/ Understanding	12	16,82	3,40	27,50 /0,000	326	above
Commitment	12	17,65	3,46	31,67 /0,000	338	above
Network	12	16,57	4,18	21,19 /0,000	311	above

Appendix 4

The development of friendships

Table 1: Descriptive statistics for the development of different categories of friendships

Categories of friendship	Mean	SD	Min	Max	N
the best	17,61	3,89	7,86	21,86	376
best off-line	17,81	2,22	7,86	21,86	320
best on-line	16,58	2,60	11,86	21,71	38
on-line	13,19	3,52	5,14	21,43	138
all on-line	13,88	3,54	5,14	21,71	167

Table 2: One-way analysis of variance - the development of different categories of friendships

F	d.f.	p
121,35	4;1034	0,000

Table 3: Multiple Range Tests - the development of different categories of friendships

Categories of friendship	best off-line	best on-line	on-line	all on-line
the best	-0,19	*1,04	*4,42	*3,72
best off-line		*1,23	*4,61	*3,92
best on-line			*3,38	*2,69
on-line				*-0,69

* denotes a statistically significant difference

Table 4: Variance check and non-parametric test - the development of different categories of friendships

Levene's test		Kruskall-Wallis Test	
F	p	t	p
23,20	0,000	276,20	0,000
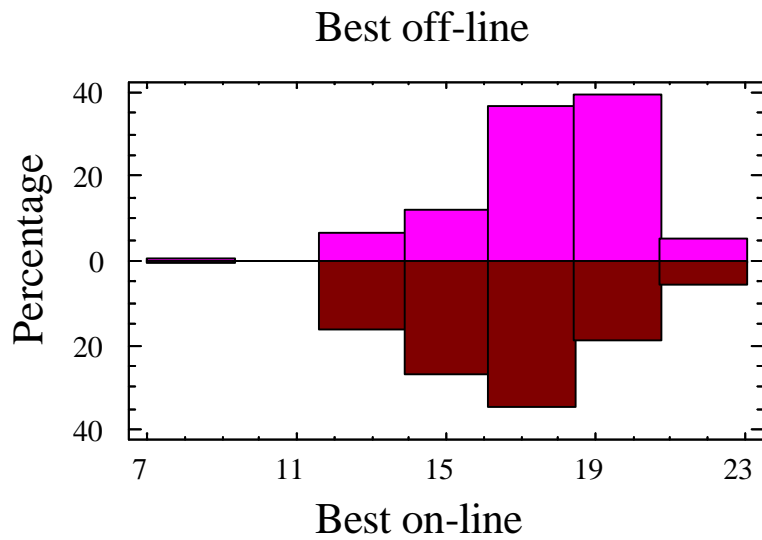
Best off-line

Figure 1: Percentage distribution for the development of best off-line and best on-line friendships

Table 5: T-test to compare means of the development of best off-line and best on-line friendships

Variance test		t	p
F	p	3,17	0,001
0,73	0,162		
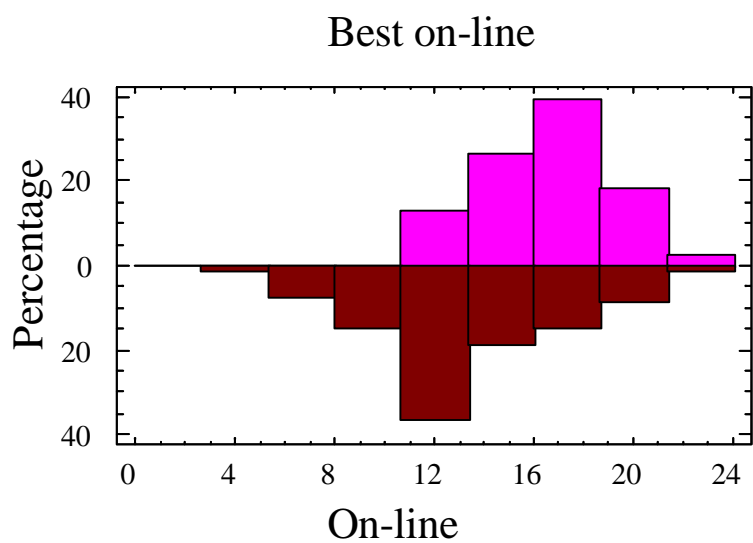
Figure 2: Percentage distribution for the development of best on-line and on-line friendships

Table 6: T-test to compare means of the development of best on-line and on-line friendships

Variance test		t	p
F	p	6,54	0,000
0,54	0,034		

Appendix 5.1

Comparison of the means of each subscale of the On-line Relationships Scales for different categories of friendships

Acronyms for the subscales of the On-line Relationships Scales:
I - interdependence,
B - breadth,
D - depth,
CC - code change,
P - predictability/understanding,
C - commitment,
N - network convergence

Table 1: One-way analysis of variance - Interdependence subscale of different categories of friendships

F	d.f.	p	the best	best off-line	best on-line	on-line	all on-line
88,22	4;1034	0,000	21,27	21,47	20,39	14,61	15,68

Table 2: Multiple Range Tests - Interdependence subscale of different categories of friendships

Categories of friendship	on-line	the best	best on-line	best off-line
all on-line	1,07	*-5,6	*-4,72	*-5,79
on-line		*-6,66	*-5,79	*-6,86
the best			0,87	-0,20
best on-line				-1,07

* denotes a statistically significant difference

Table 3: Variance check and non-parametric test - Interdependence subscale of different categories of friendships

Levene's test		Kruskall-Wallis Test	
F	p	t	p
14,69	0,000	228,19	0,000

Table 4: Descriptive statistics for Interdependence subscale of best off-line and best on-line friendships

Categories of friendship	Mean	SD	Min	Max	N
best off-line	21,47	4,21	4,0	28,0	320
best on-line	20,39	4,48	10,0	28,0	38

Figure 1: Percentage distribution for Interdependence subscale of best off-line and best on-line friendships

Table 5: T-test to compare means of Interdependence subscale of best off-line and best on-line friendships

Variance test		t	p
F	p		
0,89	0,566	1,47	0,071

Table 6: One-way analysis of variance - Breath subscale of different categories of friendships

F	d.f.	p	the best	best off-line	best on-line	on-line	all on-line
29,96	4;1034	0,000	11,76	11,76	11,53	9,71	10,11

Table 7: Multiple Range Tests - Breadth subscale of different categories of friendships

Categories of friendship	on-line	the best	best off -line	best on-line
all on-line	0,40	*-1,64	*-1,72	*-1,41
on-line		*-2,05	*-2,13	*-1,82
the best			-0,09	0,23
best off-line				0,31

* denotes a statistically significant difference

Table 8: Variance check and non-parametric test - Breadth subscale of different categories of friendships

Levene's test		Kruskall-Wallis Test	
F	p	t	p
15,49	0,000	84,99	0,000

Table 9: Descriptive statistics for Breadth subscale of best off-line and best on-line friendships

Categories of friendship	Mean	SD	Min	Max	N
best off-line	11,84	2,19	2,0	14,0	320
best on-line	11,53	2,76	4,0	14,0	38

B- best off-line

Figure 2: Percentage distribution for Breadth subscale of best off-line and best on-line friendships

Table 10: T-test to compare means of Breadth subscale of best off-line and best on-line friendships

Variance test		t	p
F	p		
0,63	0,039	0,67	0,253

Table 11: One-way analysis of variance - Depth subscale of different categories of friendships

F	d.f.	p	the best	best off-line	best on-line	on-line	all on-line
53,71	4;1034	0,000	24,54	24,71	24,19	19,63	20,44

Table 12: Multiple Range Tests - Depth subscale of different categories of friendships

Categories of friendship	on-line	the best	best off -line	best on-line
all on-line	0,81	*-4,1	*-4,27	*-3,74
on-line		*-4,91	*-5,08	*-4,56
the best			-0,17	0,36
best off-line				0,53

* denotes a statistically significant difference

Table 13: Variance check and non-parametric test - Depth subscale of different categories of friendships

Levene's test		Kruskall-Wallis Test	
F	p	t	p
37,83	0,000	120,91	0,000

Table 14: Descriptive statistics for Depth subscale of best off-line and best on-line friendships

Categories of friendship	Mean	SD	Min	Max	N
best off-line	24,71	3,51	10,0	28,0	320
best on-line	24,18	4,67	10,0	28,0	38
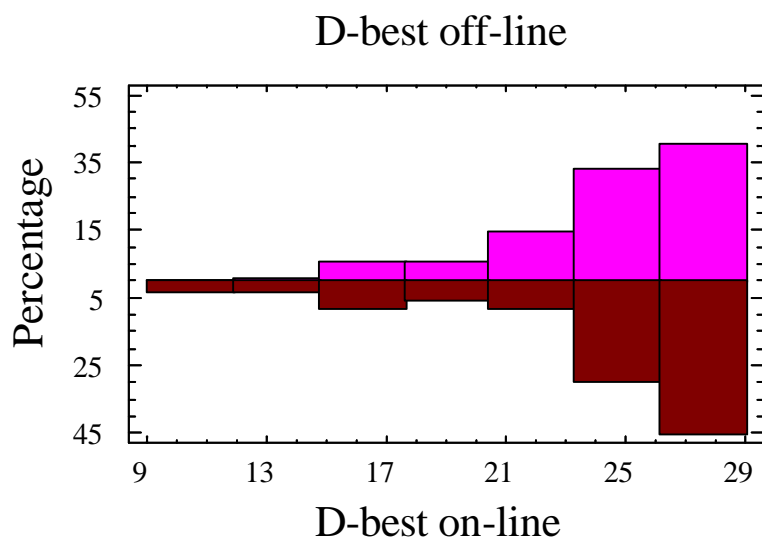
D-best off-line

Figure 3: Percentage distribution for Depth subscale of best off-line and best on-line friendships

Table 15: T-test to compare means of Depth subscale of best off-line and best on-line friendships

Variance test		t	p
F	p		
0,57	0,010	0,67	0,253

Table 16: One-way analysis of variance - Code subscale of different categories of friendships

F	d.f.	p	the best	best off-line	best on-line	on-line	all on-line
7,86	4;1034	0,000	14,68	14,68	14,50	12,64	13,10

Table 17: Multiple Range Tests - Code subscale of different categories of friendships

Categories of friendship	on-line	the best	best off-line	best on-line
all on-line	0,45	*-1,56	*-1,59	-1,40
on-line		*-2,04	*-2,04	*-1,86
the best			-0,01	0,18
best off-line				0,18

* denotes a statistically significant difference

Table 18: Variance check and non-parametric test - Code subscale of different categories of friendships

Levene's test		Kruskall-Wallis Test	
F	p	t	p
1,18	0,318	123,54	0,000

Table 19: Descriptive statistics for Code subscale of best off-line and best on-line friendships

Categories of friendship	Mean	SD	Min	Max	N
best off-line	14,68	4,59	30	210	320
best on-line	14,50	4,20	30	210	38
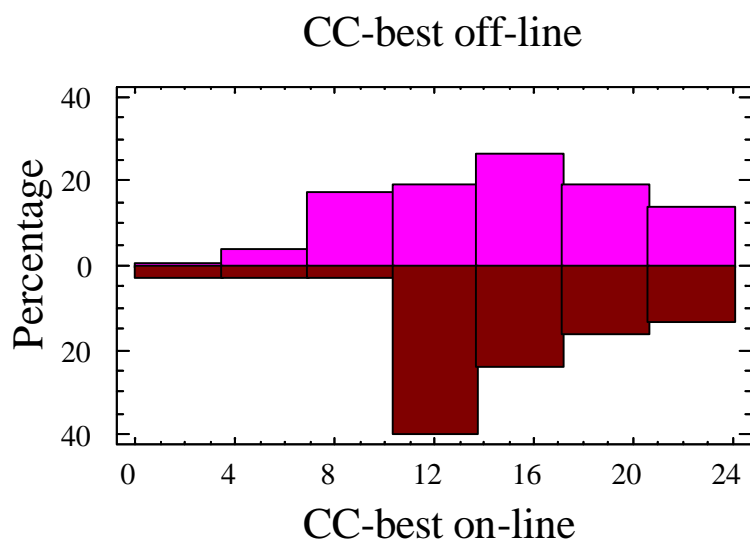
Figure 4: Percentage distribution for Code subscale of best off-line and best on-line friendships

Table 20: T-test to compare means of Code subscale of best off-line and best on-line friendships

Variance test		t	p
F	p	0,24	0,407
1,20	0,052		

Table 21: One-way analysis of variance - Predictability subscale of different categories of friendships

F	d.f.	p	the best	best off-line	best on-line	on-line	all on-line
66,62	4;1034	0,000	16,82	17,06	15,63	12,23	12,90

Table 22: Multiple Range Tests - Predictability subscale of different categories of friendships

Categories of friendship	on-line	the best	best off -line	best on-line
all on-line	0,67	*-3,92	*-4,16	*-2,73
on-line		*-4,59	*-4,83	*-3,41
the best			-0,24	1,18
best off-line				*1,42

* denotes a statistically significant difference

Table 23: Variance check and non-parametric test - Predictability subscale of different categories of friendships

Levene's test		Kruskall-Wallis Test	
F	p	t	p
13,72	0,000	174,59	0,000

Table 24: Descriptive statistics for Predictability subscale of best off-line and best on-line friendships

Categories of friendship	Mean	SD	Min	Max	N
best off-line	17,06	3,19	8,0	21,0	320
best on-line	15,63	4,33	3,0	21,0	38
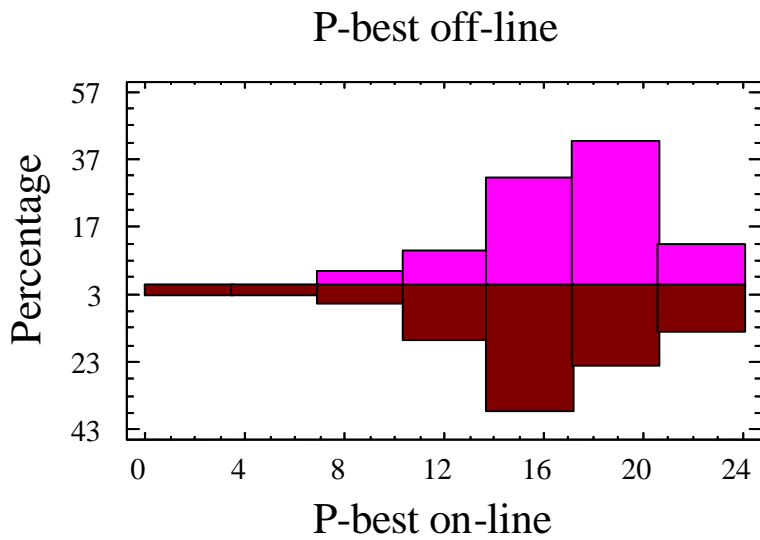
P-best off-line

Figure 5: Percentage distribution for Predictability subscale of best off-line and best on-line friendships

Table 25: T-test to compare means of Predictability subscale of best off-line and best on-line friendships

Variance test		t	p
F	p	1,97	0,028
0,54	0,006		

Table 26: One-way analysis of variance - Commitment subscale of different categories of friendships

F	d.f.	p	the best	best off-line	best on-line	on-line	all on-line
49,04	4;1034	0,000	17,65	17,69	17,92	13,73	14,59

Table 27: Multiple Range Tests - Commitment subscale of different categories of friendships

Categories of friendship	on-line	the best	best off -line	best on-line
all on-line	*0,86	*-3,05	*-3,1	*-3,33
on-line		*-3,91	*-3,96	*-4,19
the best			-0,05	-0,27
best off-line				-0,23

* denotes a statistically significant difference

Table 28: Variance check and non-parametric test - Commitment subscale of different categories of friendships

Levene's test		Kruskall-Wallis Test	
F	p	t	p
1,81	0,124	156,82	0,000

Table 29: Descriptive statistics for Commitment subscale of best off-line and best on-line friendships

| Categories of friendship	Mean	SD	Min	Max	N
best off-line	17,69	3,43	7,0	21,0	320
best on-line	17,92	3,46	12,0	21,0	38
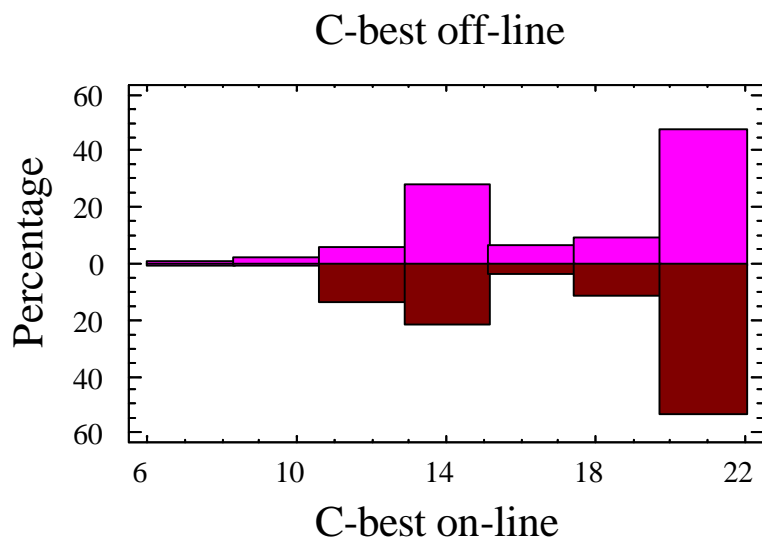
Figure 6: Percentage distribution for Commitment subscale of best off-line and best on-line friendships

Table 30: T-test to compare means of Commitment subscale of best off-line and best on-line friendships

Variance test		t	p
F	p	-0,39	0,349
0,98	0,894		

Table 31: One-way analysis of variance - Network subscale of different categories of friendships

F	d.f.	p	the best	best off-line	best on-line	on-line	all on-line
126,23	4;1034	0,000	16,57	17,18	11,87	9,79	10,37

Table 32: Multiple Range Tests - Network subscale of different categories of friendships

Categories of friendship	on-line	the best	best off -line	best on-line
all on-line	0,58	*-6,2	*-6,81	-1,5
on-line		*-6,78	*-7,39	*-2,08
the best			-0,61	*4,70
best off-line				*5,32

* denotes a statistically significant difference

Table 33: Variance check and non-parametric test - Network subscale of different categories of friendships

Levene's test		Kruskall-Wallis Test	
F	p	t	p
18	0,000	304,82	0,000

Table 34: Descriptive statistics for Network subscale of best off-line and best on-line friendships

Categories of friendship	Mean	SD	Min	Max	N
best off-line	17,18	3,57	5,0	21,0	320
best on-line	11,87	5,64	3,0	21,0	38
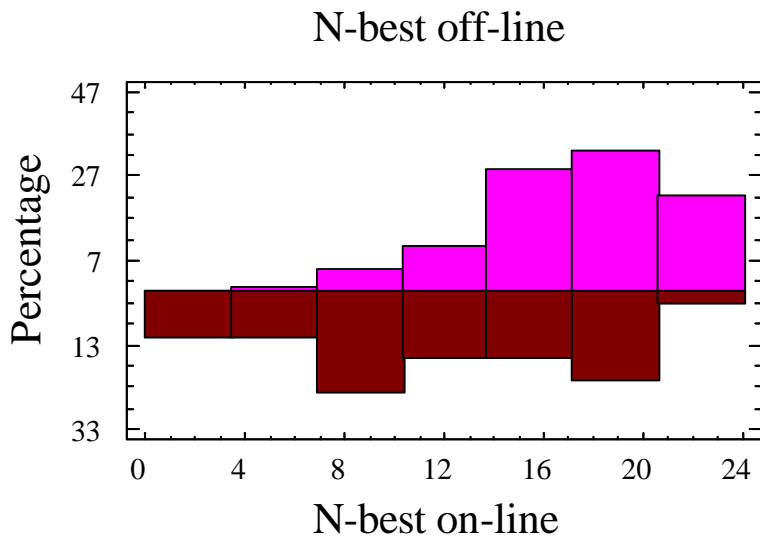
N-best off-line

Figure 7: Percentage distribution for Network subscale of best off-line and best on-line friendships

Table 35: T-test to compare means of Network subscale of best off-line and best on-line friendships

Variance test		t	p
F	p		
0,40	0,000	8,07	0,000

Appendix 5.2

Comparison of the means of each subscale of the On-line Relationships Scales for best off-line and all on-line friendships

Acronyms for the subscales of the On-line Relationships Scales:

I - interdependence,
B - breadth,
D - depth,
CC - code change,
P - predictability/understanding,
C - commitment,
N - network convergence

Table 1: Descriptive statistics for Interdependence subscale of best off-line and all on-line friendships

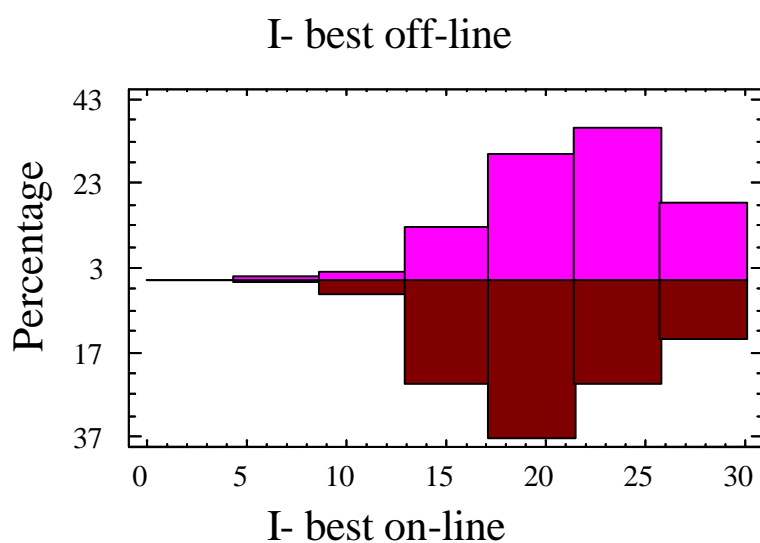| Categories of friendship	Mean	SD	N
best off-line	21,47	4,21	320
all on-line	15,68	6,08	167
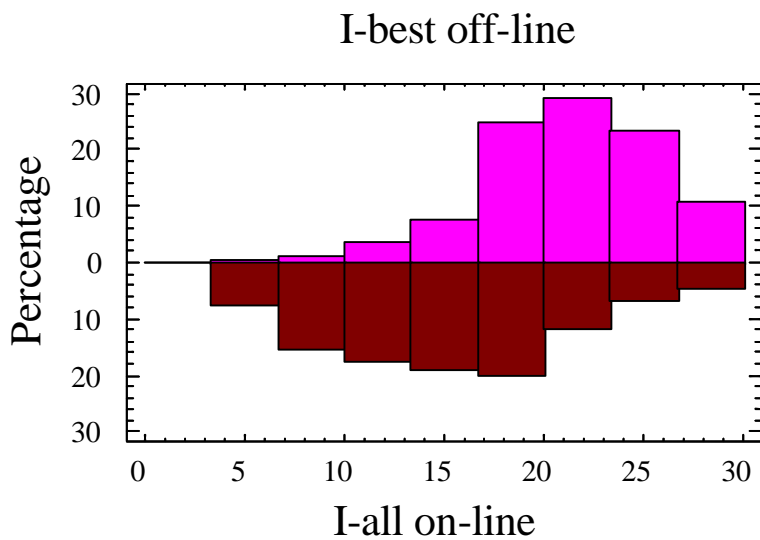
Figure 1: Percentage distribution for Interdependence subscale of best off-line and best on-line friendships

Table 2: T-test to compare means of Interdependence subscale of best off-line and all on-line friendships

Variance test		t	p
F	p	11,00	0,000
0,48	0,000		

Table 3: Descriptive statistics for Breadth subscale of best off-line and all on-line friendships

Categories of friendship	Mean	SD	N
best off-line	11,84	2,19	320
all on-line	10,11	3,02	167
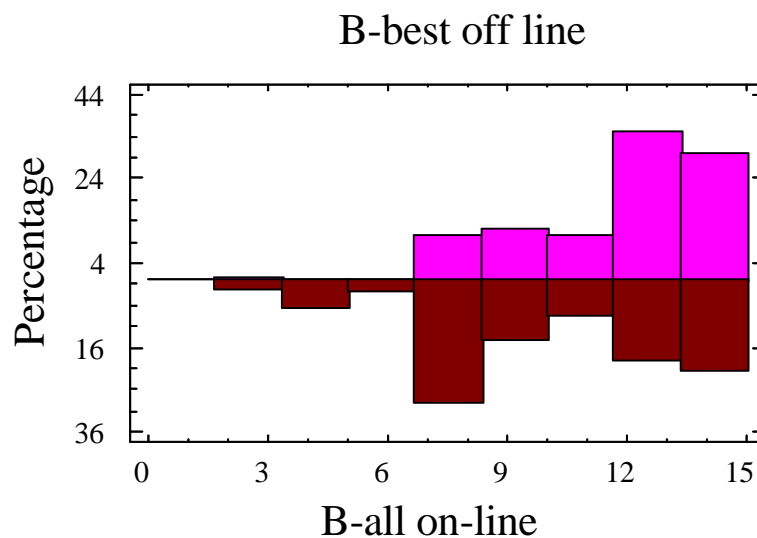
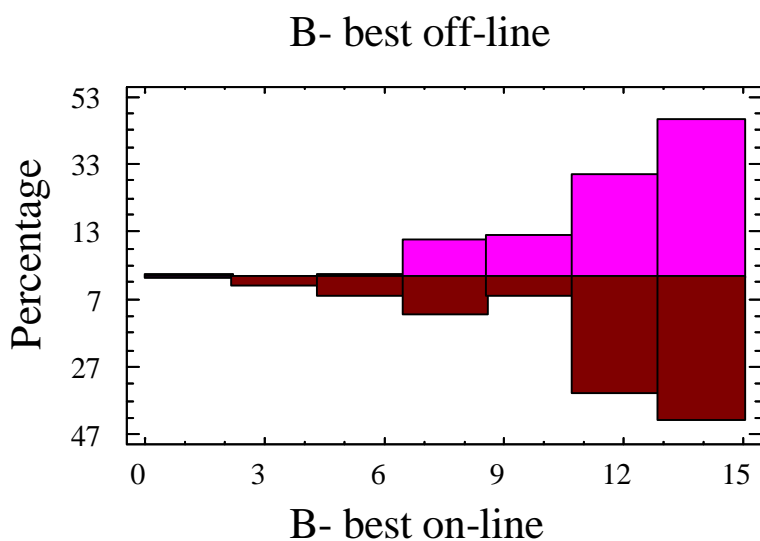
Figure 2: Percentage distribution for Breadth subscale of best off-line and all on-line friendships

Table 4: T-test to compare means of Breadth subscale of best off-line and all on-line friendships

Variance test		t	p
F	p	6,54	0,000
0,53	0,000		

Table 5: Descriptive statistics for Depth subscale of best off-line and all on-line friendships

Categories of friendship	Mean	SD	N
best off-line	24,71	3,51	320
all on-line	20,44	6,18	167
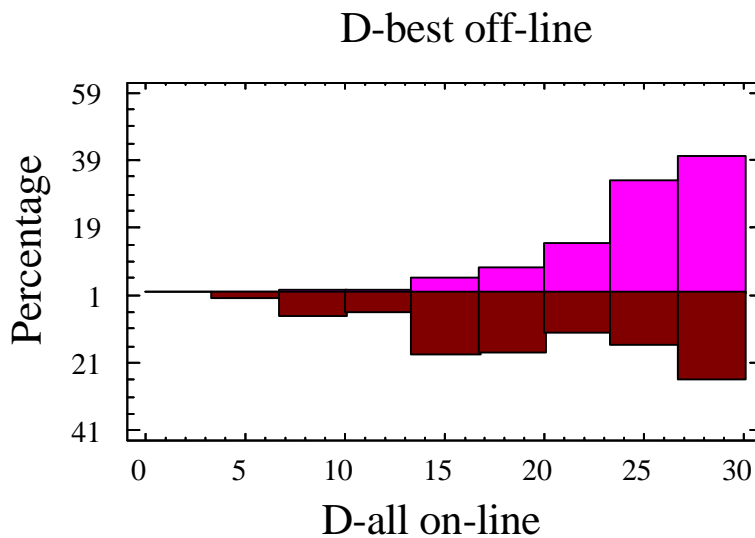
D-best off-line

Figure 3: Percentage distribution for Depth subscale of best off-line and all on-line friendships

Table 6: T-test to compare means of Depth subscale of best off-line and all on-line friendships

Variance test		t	p
F	p		
0,32	0,000	8,26	0,000

Table 7: Descriptive statistics for Code subscale of best off-line and all on-line friendships

Categories of friendship	Mean	SD	N
best off-line	14,68	4,59	320
all on-line	13,09	5,08	167
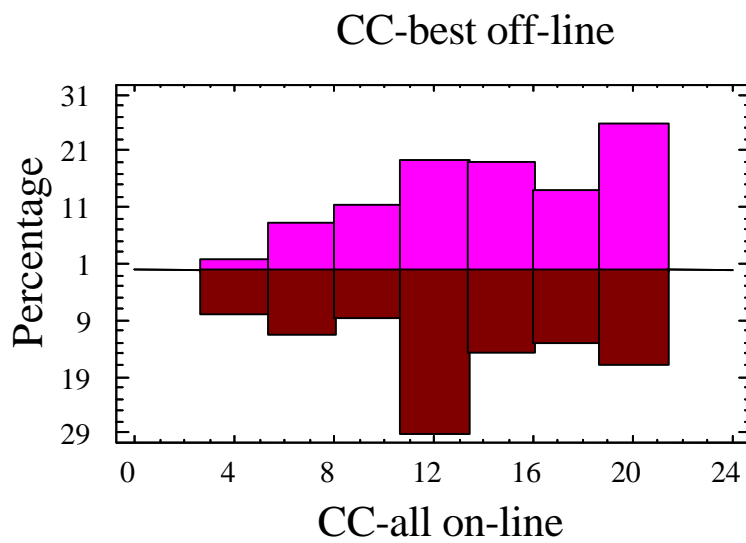
Figure 4: Percentage distribution for Code subscale of best off-line and all on-line friendships

Table 8: T-test to compare means of Code subscale of best off-line and all on-line friendships

Variance test		t	p
F	p	3,49	0,000
0,88	0,128		

Table 9: Descriptive statistics for Predictability subscale of best off-line and all on-line friendships

| Categories of friendship	Mean	SD	N
best off-line	17,06	3,18	320
all on-line	12,90	5,01	167
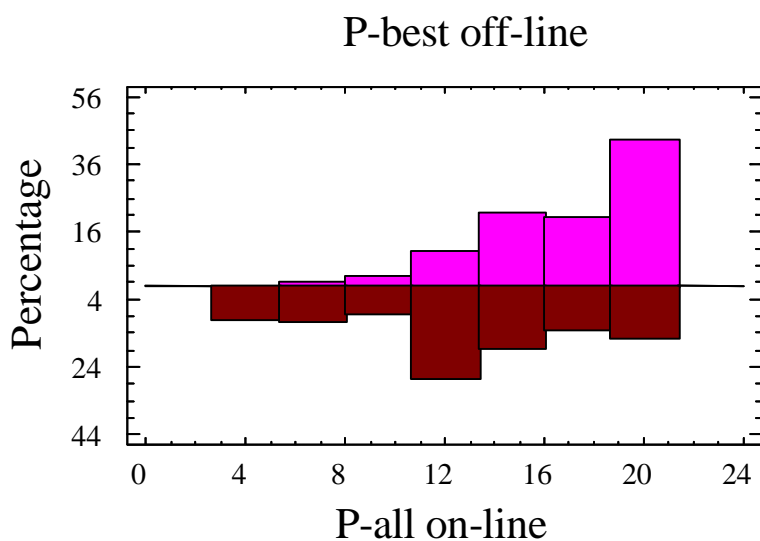
P-best off-line

Figure 5: Percentage distribution for Predictability subscale of best off-line and all on-line friendships

Table 10: T-test to compare means of Predictability subscale of best off-line and all on-line friendships

Variance test		t	p
F	p		
0,40	0,000	9,75	0,000

Table 11: Descriptive statistics for Commitment subscale of best off-line and all on-line friendships

Categories of friendship	Mean	SD	N
best off-line	17,69	3,43	320
all on-line	14,59	4,32	167
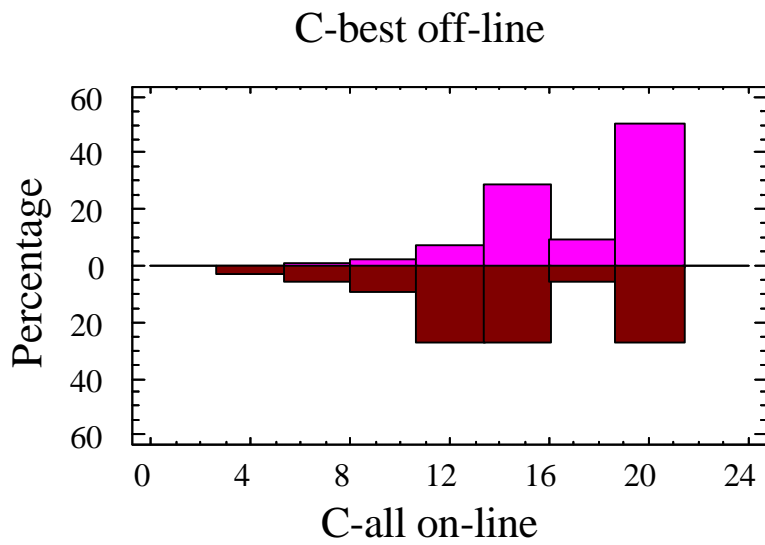
C-best off-line

Figure 6: Histogram for Commitment subscale of best off-line and all on-line friendships

Table 12: T-test to compare means of Commitment subscale of best off-line and all on-line friendships

Variance test		t	p
F	p		
0,63	0,000	8,04	0,000

Table 13: Descriptive statistics for Network subscale of best off-line and all on-line friendships

| Categories of friendship	Mean	SD	N
best off-line	17,18	3,57	320
all on-line	10,37	5,44	167
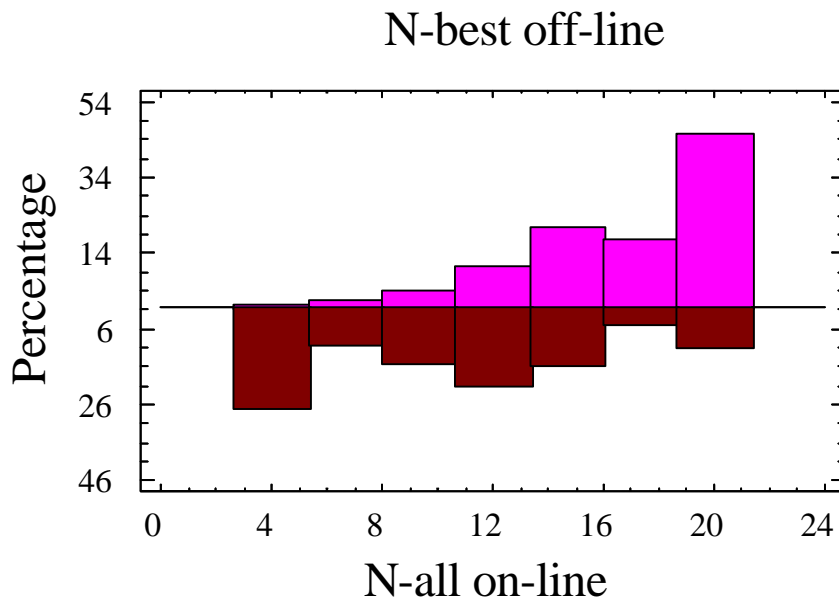
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Figure 7: Percentage distribution for Network subscale of best off-line and all on-line friendships

Table 14: T-test to compare means of Network subscale of best off-line and all on-line friendships

Variance test		t	p
F	p	14,62	0,000
0,43	0,000		

Appendix 6.1

Looking for and forming on-line friendships - psychological characteristics

Looking for on-line friends

Table 1: Analysis of Variance for shyness - Type III Sums of Squares

	F	d.f.	p
Looking for friends	1,45	1	0,2293
Gender	0,42	1	0,5166
INTERACTIONS	4,73	1	0,0302

Table 2: Least Squares Means for shyness

Looking for friends	Gender: female	Gender: male
No	2,54	2,32
Yes	2,37	2,60

Table 3: Analysis of Variance for shyness for females and males

Gender	F	d.f.	p
Females	0,38	1;193	0,5363
Males	7,12	1;234	0,0082

Table 4: Analysis of Variance for sociability - Type III Sums of Squares

	F	d.f.	p
Looking for friends	0,10	1	0,7470
Gender	1,00	1	0,3185
INTERACTIONS	0,16	1	0,6875

Table 5: Analysis of Variance for extroversion - Type III Sums of Squares

	F	d.f.	p
Looking for friends	0,60	1	0,4406
Gender	8,25	1	0,0043
INTERACTIONS	1,35	1	0,2455

Table 6: Least Squares Means for extroversion

Gender:	Mean
Female	8,17
Male	7,29

Forming on-line friendships

Table 7: Analysis of Variance for shyness - Type III Sums of Squares

	F	d.f.	p
On-line friends	0,05	1	0,8148
Gender	0,04	1	0,8346
INTERACTIONS	7,41	1	0,0067

Table 8: Least Squares Means for shyness

On-line friends	Gender: female	Gender: male
No	2,54	2,34
Yes	2,3	2,54

Table 9: Analysis of Variance for shyness for females and males

Gender	F	d.f.	p
Females	3,82	1;194	0,0521
Males	3,56	1;235	0,0606

Table 10: Analysis of Variance for sociability - Type III Sums of Squares

	F	d.f.	p
On-line friends	0,35	1	0,5565
Gender	0,99	1	0,3209
INTERACTIONS	0,00	1	0,9878

Table 11: Analysis of Variance for extroversion - Type III Sums of Squares

	F	d.f.	p
On-line friends	0,01	1	0,9039
Gender	7,64	1	0,006
INTERACTIONS	1,64	1	0,2009

Table 12: Least Squares Means for extroversion

Gender:	Mean
Female	8,13
Male	7,33

Table 13: The effects of having one's best friend on-line on psychological characteristics

	F	d.f.	p	No	Yes
Shyness	0,37	1; 252	0,5416	2,45	2,34
Sociability	3,80	1 ; 252	0,0524	3,62	3,22
Extroversion	1,53	1 ; 252	0,2170	7,8	7,0

Table 14: Correlations between No. of on-line and off-line friends and psychological characteristics

	Shyness	Sociability	Extroversion
No. of on-line friends	-0,05	-0,05	0,03
No.of off-line friends	-0,13*	0,09	0,13*

*indicates $p<0,05$

Table 15: Multiple Regression Analysis - number of on-line friends and psychological characteristics (dependent variable: No. of on-line friends)

	Estimate (B)	Standard Error	t	p
Constant	3,86	1,74	2,22	0,0273
Shyness	-0,35	0,38	-0,93	0,3525
Sociability	-0,47	0,29	-1,59	0,1126
Extroversion	0,07	0,11	0,6	0,5498

Analysis of Variance

F	d.f.	p	R	R-squared
1,17	3;396	0,3190	0,094	0,01

Table 16: Multiple Regression Analysis - number of off-line friends and psychological characteristics (dependent variable: No.of off-line friends)

	Estimate (B)	Standard Error	t	p
Constant	8,22	5,07	1,62	0,1057
Shyness	-1,34	1,09	-1,23	0,2202
Sociability	0,47	0,84	0,56	0,5736
Extroversion	0,34	0,32	1,07	0,2836

Analysis of Variance

F	d.f.	p	R	R-squared
3,08	3:424	0,0273	0,14	0,02

Table 17: Simple Regressions - No. of off-line friends vs. psychological characteristics

	Estimate (B)	Standard Error	t	p
Shyness	-2,29	0,86	-2,66	0,0081
Sociability	1,39	0,74	1,88	0,0612
Extroversion	0,61	0,24	2,59	0,0099

Analysis of Variance

	F-ratio	d.f.	p	R	R-squared
Shyness	7,08	1;426	0,0081	-0,13	0,02
Sociability	3,52	1;426	0,0612	0,09	0,008
Extroversion	6,72	1;427	0,0099	0,12	0,02

Table 18: Correlations between number of on-line friends to number of all friends and psychological characteristics

	Shyness	Sociability	Extroversion
No. of on-line friends to no. of all friends	0,09	-0,13*	-0,1

*indicates p<0,05

Appendix 6.2

Looking for and forming on-line friendships - social characteristics

Looking for on-line friends

Table 1: Analysis of Variance for loneliness - Type III Sums of Squares

	F	d.f.	p
Looking for friends	7,42	1	0,0067
Gender	3,01	1	0,0834
INTERACTIONS	0,07	1	0,7850

Table 2: Least Squares Means for loneliness

Looking for friends	No	Yes
Mean	2,02	2,22

Table 3: Analysis of Variance for social support - Type III Sums of Squares

	F	d.f.	p
Looking for friends	4,94	1	0,0268
Gender	5,81	1	0,0164
INTERACTIONS	0,77	1	0,3812

Table 4: Least Squares Means for social support

Looking for friends	No	Yes
Mean	5,29	5,00

Table 5: Least Squares Means for social support

Gender:	Mean
Female	5,3
Male	5,0

Table 6: Analysis of Variance for support from friends - Type III Sums of Squares

	F	d.f.	p
Looking for friends	3,62	1	0,0579
Gender	6,24	1	0,0129
INTERACTIONS	1,10	1	0,2942

Table 7: Least Squares Means for support from friends

Gender:	Mean
Female	5,51
Male	5,14

Table 8: Analysis of Variance for support from family - Type III Sums of Squares

	F	d.f.	p
Looking for friends	0,7498	1	0,0962
Gender	1,71	1	0,1919
INTERACTIONS	0,10	1	0,7498

Table 9: Analysis of Variance for local network - Type III Sums of Squares

	F	d.f.	p
Looking for friends	0,99	1	0,3195
Gender	0,03	1	0,8660
INTERACTIONS	0,15	1	0,7009

Table 10: Analysis of Variance for distant network - Type III Sums of Squares

	F	d.f.	p
Looking for friends	0,58	1	0,4465
Gender	16,09	1	0,0001
INTERACTIONS	2,65	1	0,1041

Table 11: Least Squares Means for distant network

Gender:	Mean
Female	17,49
Male	34,92

Table 12: Analysis of Variance for number of friends - Type III Sums of Squares

	F	d.f.	p
Looking for friends	2,17	1	0,1416
Gender	0,01	1	0,9172
INTERACTIONS	0,81	1	0,3697

Table 13: Analysis of Variance for number of off-line friends - Type III Sums of Squares

	F	d.f.	p
Looking for friends	5,69	1	0,0174
Gender	0,03	1	0,8740
INTERACTIONS	0,03	1	0,4611

Table 14: Least Squares Means for number of off-line friends

Looking for friends	No	Yes
Mean	10,13	6,75

Table 15: Analysis of Variance for number of on-line friends - Type III Sums of Squares

	F	d.f.	p
Looking for friends	5,77	1	0,0166
Gender	0,04	1	0,8508
INTERACTIONS	0,73	1	0,3931

Table 16: Table of Least Squares Means for number of on-line friends

Looking for friends	No	Yes
Mean	1,61	2,78

Forming on-line friendships

Table 17: Analysis of Variance for loneliness - Type III Sums of Squares

	F	d.f.	p
On-line friends	0,07	1	0,7871
Gender	1,77	1	0,1843
INTERACTIONS	4,14	1	0,0426

Table 18: Least Squares Means for loneliness

On-line friends	Gender: female	Gender: male
No	2,19	1,96
Yes	2,07	2,12

Table 19: Analysis of Variance for loneliness

Gender	F	d.f.	p
Females	1,44	1; 194	0,2316
Males	2,90	1; 235	0,0899

Table 20: Analysis of Variance for social support - Type III Sums of Squares

	F	d.f.	p
On-line friends	0,04	1	0,8495
Gender	9,70	1	0,0020
INTERACTIONS	1,51	1	0,2196

Table 21: Least Squares Means for social support

Gender:	Mean
Female	5,38
Male	5,01

Table 22: Analysis of Variance for support from friends - Type III Sums of Squares

	F	d.f.	p
On-line friends	0,11	1	0,7458
Gender	11,15	1	0,0009
INTERACTIONS	3,14	1	0,0770

Table 23: Least Squares Means for support from friends

Gender:	Mean
Female	5,61
Male	5,14

Table 24: Analysis of Variance for local network - Type III Sums of Squares

	F	d.f.	p
On-line friends	0,97	1	0,3261
Gender	0,09	1	0,7673
INTERACTIONS	1,25	1	0,2633

Table 25: Analysis of Variance for distant network - Type III Sums of Squares

	F	d.f.	p
On-line friends	0,16	1	0,6930
Gender	14,21	1	0,0002
INTERACTIONS	1,32	1	0,2506

Table 26: Least Squares Means for distant network

Gender:	Mean
Female	18,26
Male	33,57

Table 27: The effect of having one's best friend on-line on social characteristics

Social characteristics	F	d.f.	p	No	Yes
Loneliness	4,65	1;252	0,0320	2,03	2,36
Social support	1,54	1;252	0,2165	5,28	4,95
Support from friends	4,55	1;252	0,0339	5,52	4,89
Local network	3,71	1;368	0,0548	13,12	20,16
Distant network	0,37	1;368	0,5409	26,73	32,16
No. of friends	0,34	1;367	0,5622	10,97	12,84
No. of off-line friends	0,51	1;366	0,4742	9,68	7,58
No. of on-line friends	23,56	1;331	0,000	1,45	5,61

Table 28: Correlations between the number of friends and social characteristics

	Loneliness	Support from friends	Support
No. of friends	-0,13*	-0,03	-0,02
No. of off-line friends	-0,14*	-0,02	-0,02
No. of on-line friends	-0,03	-0,03	-0,01
No. of on-line friends to No. of friends	0,12*	-0,11*	-0,09

*indicates p<0,05

Table 29: Regression Analysis - loneliness vs No. of friends

Loneliness	Estimate (B)	Standard Error	t	p
No. of friends	-0,01	0,002	-2,65	0,0083
No. of off-line friends	-0,01	0,002	-2,92	0,0037
No. of on-line friends	-0,003	0,01	-0,51	0,6102

Analysis of Variance

Loneliness	F-Ratio	d.f.	p	R	R-squared
No. of friends	7,04	1;426	0,0083	-0,13	0,02
No. of off-line friends	8,53	1;426	0,0037	-0,14	0,02
No. of on-line friends	0,26	1;398	0,6102	-0,03	0,001

Table 30: Regression Analysis - support from friends vs number of friends

Support from friends	Estimate (B)	Standard Error	t	p
No. of friends	-0,002	0,004	-0,57	0,5712
No. of off-line friends	-0,002	0,005	-0,44	0,6553
No. of on-line friends	-0,01	0,02	-0,61	0,5448

Analysis of Variance

Support from friends	F-Ratio	d.f.	p	R	R-squared
No. of friends	0,32	1;426	0,5712	-0,03	0,001
No. of off-line friends	0,20	1;426	0,6553	-0,02	0,001
No. of on-line friends	0,37	1;398	0,5448	-0,03	0,001

Appendix 6.3

Looking for and forming on-line friendships - demographic characteristics

Looking for on-line friends

Table 1: Gender by looking for on-line friends

	No	Yes
Female	185 32,86%	81 14,39%
Male	195 34,64%	102 18,12%

Chi-Square Test= 0,97; p= 0,3249

Table 2: Marital status by looking for on-line friends

	No	Yes
Divorced	4 0,71%	0 0,00%
Married	19 3,37%	6 1,07%
Single	357 63,41%	177 31,44%

Chi-Square Test= 2,85; p= 0,2404

Table 3: Partner by looking for on-line friends

	No	Yes
No	172 31,97%	101 18,77%
Yes	189 35,13%	76 14,13%

Chi-Square Test= 4,21; p= 0,0401

Forming on-line friendship

Table 4: One-way analysis of variance - number of on-line friends by gender

	F	d.f.	p	Female	Male
No. of on-line friends	0,18	1;519	0,6687	2,08	1,88
No. of friends	0,06	1;556	0,8018	11,06	10,68
No. of off-line friends	0,02	1;555	0,8768	9,14	8,94

Table 5: Gender by best on-line friend

	No	Yes
Female	159 42,29%	19 5,05%
Male	179 47,61%	19 5,05%

Chi-Square Test= 0,12; p= 0,729

Appendix 6.4

Looking for and forming on-line friendships - Internet usage

Looking for on-line friends

Table 1: Analysis of Variance for experience in using the Internet - Type III Sums of Squares

	F	d.f.	p
Looking for friends	1,59	1	0,2085
Gender	40,52	1	0,0000
INTERACTIONS	1,39	1	0,2396

Table 2: Least Squares Means for experience in using the Internet

Gender:	Mean
Female	40,49
Male	54,70

Table 3: Analysis of Variance for hours on-line - Type III Sums of Squares

	F	d.f.	p
Looking for friends	8,71	1	0,0033
Gender	42,28	1	0,0000
INTERACTIONS	6,81	1	0,0093

Table 4: Least Squares Means for hours on-line

Looking for friends	Gender: female	Gender: male
No	13,00	19,00
Yes	13,50	27,55

Table 5: Analysis of Variance for Internet session - Type III Sums of Squares

	F	d.f.	p
Looking for friends	4,80	1	0,0289
Gender	23,26	1	0,0000
INTERACTIONS	4,26	1	0,0395

Table 6: Least Squares Means for Internet session

Looking for friends	Gender: female	Gender: male
No	97,72	130,60
Yes	99,22	181,28

Forming on-line friendship

Table 7: Analysis of Variance for experience in using the Internet - Type III Sums of Squares

	F	d.f.	p
On-line friends	2,55	1	0,1108
Gender	51,75	1	0,0000
INTERACTIONS	0,07	1	0,7939

Table 8: Least Squares Means for experience in using the Internet

Gender:	Mean
Female	40,48
Male	55,46

Table 9: Analysis of Variance for hours on-line - Type III Sums of Squares

	F	d.f.	p
On-line friends	29,11	1	0,0000
Gender	42,43	1	0,0000
INTERACTIONS	0,99	1	0,3198

Table 10: Least Squares Means for hours on-line

	Mean
Gender: Female	13,07
Gender: Male	22,34
On-line friends: No	13,87
On-line friends: Yes	21,54

Table 11: Analysis of Variance for Internet session - Type III Sums of Squares

	F	d.f.	p
On-line friends	8,66	1	0,0034
Gender	21,42	1	0,0000
INTERACTIONS	0,07	1	0,7950

Table 12: Least Squares Means for Internet session

	Mean
Gender: Female	97,87
Gender: Male	149,32
On-line friends: No	107,24
On-line friends: Yes	139,95

Table 13: One-way analysis of variance - Internet usage by best on-line friend

Internet usage	F	d.f.	p	No	Yes
Internet experience	5,86	1;374	0,0160	50,8	40,59
Hours on-line	12,23	1;372	0,0005	17,21	27,89
Internet session	3,86	1;374	0,0501	124,6	172,63

Table 14: Correlations between number of on-line friends and ratio of number of on-line friends to number of all friends and Internet usage

	Internet experience	hours on-line	Internet session
No.of on-line friends	-0,06	0,10*	0,03
No.of on-line friends to all friends	-0,10*	0,23*	0,09*

*indicates p<0,05

Table 15: Multiple Regression Analysis - number of on-line friends vs. Internet usage

	Estimate (B)	Standard Error	t	p
Constant	2,26	0,51	4,41	0,0000
Internet experience	-0,02	0,01	-1,72	0,0866
Hours on-line	0,04	0,02	2,45	0,0147
Internet session	-0,00	0,00	2,45	0,2970

Analysis of Variance

F	d.f.	p	R	R-squared
2,92	3;514	0,0335	0,13	0,02

Appendix 6.5

Looking for and forming on-line friendships - attitudes to the Internet

Looking for on-line friends

Table 1: Analysis of Variance for scepticism - Type III Sums of Squares

	F	d.f.	p
Looking for friends	25,55	1	0,0000
Gender	2,00	1	0,1584
INTERACTIONS	1,21	1	0,2729

Table 2: Least Squares Means for scepticism

Looking for friends	No	Yes
Mean	2,46	2,82

Table 3: Analysis of Variance for social orientation - Type III Sums of Squares

	F	d.f.	p
Looking for friends	31,24	1	0,0000
Gender	27,52	1	0,0000
INTERACTIONS	0,25	1	0,6164

Table 4: Least Squares Means for social orientation

	Mean
Gender: Female	52,06
Gender: Male	41,24
Looking for: No	40,89
Looking for: Yes	52,42

Forming on-line friendship

Table 5: Analysis of Variance for scepticism - Type III Sums of Squares

	F	d.f.	p
On-line friends	52,06	1	0,0000
Gender	2,60	1	0,1075
INTERACTIONS	2,60	1	0,1079

Table 6: Least Squares Means for scepticism

On-line friends	No	Yes
Mean	2,37	2,84

Table 7: Analysis of Variance for social orientation - Type III Sums of Squares

	F	d.f.	p
On-line friends	27,43	1	0,0000
Gender	23,48	1	0,0000
INTERACTIONS	0,88	1	0,3489

Table 8: Least Squares Means for social orientation

	Mean
Gender: Female	49,38
Gender: Male	39,99
On-line friends: No	39,61
On-line friends: Yes	49,75

Table 9: Analysis of Variance for task orientation - Type III Sums of Squares

	F	d.f.	p
On-line friends	22,12	1	0,0000
Gender	26,38	1	0,0000
INTERACTIONS	0,80	1	0,3717

Table 10: Least Squares Means for task orientation

	Mean
Gender: Female	48,77
Gender: Male	58,88
On-line friends: No	58,45
On-line friends: Yes	49,19

Table 11: Analysis of Variance for number of on-line friends - Type III Sums of Squares

	F	d.f.	p
Looking for friends	5,77	1	0,0166
Gender	0,04	1	0,8508
INTERACTIONS	0,73	1	0,3931

Table 12: Least Squares Means for number of on-line friends

Looking for friends	No	Yes
Mean	1,61	2,78

Table 13: One-way analysis of variance - attitudes to the Internet by best on-line friend

	F	d.f.	p	No	Yes
Scepticism	9,17	1;252	0,0027	2,49	2,96
Social orientation	13,16	1;374	0,0003	42,32	56,50
Task orientation	10,45	1;374	0,0013	56,56	43,76

Table 14: Correlations between number of on-line friends and number of off-line friends to all friends and attitudes to the Internet

	Social orientation	Task orientation	Scepticism
No. of on-line friends	0,10*	-0,06	0,23*
No. of off-line friends to all	0,23*	-0,19*	0,37*

*indicates p<0,05

Table 15: Simple Regressions - number of on-line friends vs. attitudes to the Internet

No.of on-line friends	Estimate (B)	Standard Error	t	p
Scepticism	1,59	0,34	4,64	0,0000
Social orientation	0,03	0,01	3,29	0,0011
Task orientation	-0,02	0,01	-2,53	0,0117

Analysis of Variance

No. of on-line friends	F-Ratio	d.f.	p	R	R-squared
Scepticism	21,50	1;399	0,0000	0,23	0,05
Social orientation	10,80	1;519	0,0011	0,14	0,02
Task orientation	6,40	1;519	0,0117	-0,11	0,01

Appendix 7

Individual differences - quality of on-line friendships

Psychological factors

The aggregate scores on the On-line Relationship Scales for three categories of friendships: *all on-line*, *the best off-line* or *the best on-line* were used to measure the quality/development of friendships

Table 1: Correlation between the quality of friendships and psychological characteristics

	Shyness	Sociability	Extroversion
Quality of best off-line	-0,23*	0,25*	0,27*
Quality of all on-line	-0,13	-0,14	0,11

Table 2: Multiple Regression Analysis - the quality of the best off-line friendships vs. psychological characteristics (dependent variable: the quality of best off-line friendships)

	Estimate (B)	Standard Error	t	p
Constant	16,42	1,00	16,35	0,0000
Shyness	-0,24	0,21	-1,15	0,2526
Sociability	0,33	0,17	1,93	0,0550
Extroversion	0,10	0,06	1,56	0,1191

Analysis of Variance

F	d.f.	p	R	R-squared
7,42	3;215	0,0001	0,31	0,09

Table 3: Stepwise regression - the quality of the best off-line friendships vs. psychological characteristics (dependent variable: the quality of best off-line friendships)

	Estimate (B)	Standard Error	t	p
Constant	15,47	0,56	27,45	0,0000
Sociability	0,35	0,17	2,06	0,0401
Extroversion	0,14	0,05	2,54	0,0118

Analysis of Variance

F	d.f.	p	R	R-squared
10,46	2;216	0,0000	0,30	0,09

Table 4: Multiple Regression Analysis- the quality of all on-line friendships vs. psychological characteristics (dependent variable: the quality of all on-line friendships)

	Estimate (B)	Standard Error	t	p
Constant	17,4	2,64	6,58	0,0000
Shyness	-0,58	0,53	-1,11	0,2707
Sociability	-0,91	0,40	-2,26	0,0256
Extroversion	0,15	0,16	0,94	0,3474

Analysis of Variance

F	d.f.	p	R	R-squared
2,36	3;106	0,0753	0,25	0,06

Table 5: Stepwise regression - the quality of all on-line friendships vs. psychological characteristics (dependent variable: the quality of all on-line friendships)

	Estimate (B)	Standard Error	t	p
Constant	18,98	2,04	9,29	0,0000
Shyness	-0,87	0,43	-2,03	0,0447
Sociability	-0,82	0,39	-2,10	0,0378

Analysis of Variance

F	d.f.	p	R	R-squared
3,10	2;107	0,0490	0,23	0,06

Table 6: Analysis of Variance for the quality of all on-line friendships by shyness and gender

F	d.f.	p	R	R-squared
1,28	3;106	0,2845	0,19	0,04

Type III Sums of Squares

	F	d.f.	p
Gender	0,03	1	0,8623
Shyness	1,14	1	0,2886
Gender*Shyness	0,13	1	0,7225

* interaction effect

Table 7: Analysis of Variance for the quality of all on-line friendships by sociability and gender

F	d.f.	p	R	R-squared
2,14	3;106	0,1000	0,24	0,06

Type III Sums of Squares

	F	d.f.	p
Gender	3,05	1	0,0838
Sociability	2,11	1	0,1493
Gender*Sociability	1,85	1	0,1762

* interaction effect

Table 8: Analysis of Variance for the quality of all on-line friendships by extroversion and gender

F	d.f.	p	R	R-squared
1,32	3;106	0,2705	0,19	0,04

Type III Sums of Squares

	F	d.f.	p
Gender	1,65	1	0,2022
Extroversion	0,45	1	0,5041
Gender*Extroversion	0,75	1	0,3881

* interaction effect

Table 9: Analysis of Variance for the quality of best off-line friendships by shyness and gender

F	d.f.	p	R	R-squared
8,16	3;215	0,0000	0,32	0,10

Type III Sums of Squares

	F	d.f.	p
Gender	1,58	1	0,2105
Shyness	12,19	1	0,0006
Gender*Shyness	4,98	1	0,0267

* interaction effect

Table 10: Analysis of Variance for the quality of best off-line friendships by sociability and gender

F	d.f.	p	R	R-squared
6,59	3;215	0,0003	0,29	0,09

Type III Sums of Squares

	F	d.f.	p
Gender	0,64	1	0,4247
Sociability	12,96	1	0,0004
Gender*Sociability	0,05	1	0,8212

* interaction effect

Table 11: Analysis of Variance for the quality of best off-line friendships by extroversion and gender

F	d.f..	p	R	R-squared
7,92	3;215	0,0000	0,31	0,10

Type III Sums of Squares

	F	d.f.	p
Gender	5,28	1	0,0225
Extroversion	13,28	1	0,0003
Gender*Extroversion	2,88	1	0,0914

* interaction effect

Social factors

Table 12: Correlations between the quality of friendships and social characteristics

	Loneliness	Support from friends	Support
Quality of all on-line	-0,06	0,34*	0,28*
Quality of best off-line	-0,29*	0,55*	0,46*
Quality of best on-line	-0,69*	0,86*	0,70*

*indicates p<0,05

Table 13: Simple Regression - loneliness vs. the quality of friendship (dependent variable: loneliness)

Loneliness	Estimate (B)	Standard Error	t	p
Quality of all on-line	-0,01	0,02	-0,64	0,5254
Quality of best off-line	-0,09	0,02	-4,44	0,0000
Quality of best on-line	-0,21	0,05	-4,35	0,0003

Analysis of Variance

Loneliness	F-Ratio	d.f.	p	r	R-squared
Quality of all on-line	0,41	1;108	0,5254	-0,06	0,0037
Quality of best off-line	19,72	1;217	0,0000	-0,29	0,08
Quality of best on-line	18,96	1;21	0,0003	-0,69	0,47

Table 14: Simple Regression - support from friends vs. the quality of friendships (dependent variable: support from friends)

Support from friends	Estimate (B)	Standard Error	t	p
Quality of all on-line	0,13	0,03	3,82	0,0002
Quality of best off-line	0,35	0,04	9,67	0,0000
Quality of best on-line	0,52	0,07	7,78	0,0000

Analysis of Variance

Support from friends	F-Ratio	d.f.	p	R	R-squared
Quality of all on-line	14,56	1;108	0,0002	0,34	0,12
Quality of best off-line	93,81	1;217	0,0000	0,55	0,30
Quality of best on-line	60,51	1;21	0,0000	0,86	0,74

Demographic characteristics - gender

Table 15: One - way analysis of variance - the quality of friendships by gender

	F	d.f.	p	Female	Male
Quality of best off-line	7,44	1;318	0,0067	18,16	17,49
Quality of all on-line	1,21	1;165	0,2724	14,21	13,58

Internet usage

Table 16: Correlations between the quality of all on-line friendships and Internet usage

	Internet experience	Hours on-line	Internet session
Quality of all on-line	-0,18*	0,05	0,11

*indicates p<0,05

Table 17: Multiple Regression Analysis – the quality of all on-line friendships vs. Internet usage (dependent variable: the quality of all on-line friendships)

	Estimate (B)	Standard Error	t	p
Constant	14,85	0,67	22,30	0,0000
Internet experience	-0,03	0,01	-2,44	0,0159
Hours on-line	0,00	0,02	0,14	0,8873
Internet session	0,00	0,00	0,64	0,5256

Analysis of Variance

F	d.f.	p	R	R-squared
2,22	3;161	0,0879	0,2	0,04

Table 18: Analysis of Variance for the quality of all on-line friendships by experience in using the Internet and gender

F	d.f.	p	R	R-squared
2,32	3;163	0,0773	0,2	0,04

Type III Sums of Squares

	F	d.f.	p
Gender	1,18	1	0,2800
Internet experience	2,76	1	0,0984
Gender*Internet experience	1,87	1	0,1736

* interaction effect

Table 19: Analysis of Variance for the quality of all on-line friendships by hours on-line and gender

F	d.f.	p	R	R-squared
0,66	3;161	0,5763	0,1	0,01

Type III Sums of Squares

	F	d.f.	p
Gender	0,62	1	0,4327
Hours on-line	0,71	1	0,4020
Gender*Hours on-line	0,01	1	0,9288

* interaction effect

Table 20: Analysis of Variance for the quality of all on-line friendships by Internet session and gender

F	d.f.	p	R	R-squared
1,18	3;163	0,3201	0,14	0,02

Type III Sums of Squares

	F	d.f.	p
Gender	0,02	1	0,8824
Internet session	2,28	1	0,1329
Gender*Internet session	1,03	1	0,3118

 * interaction effect

Attitudes to the Internet

Table 21: Correlations between the quality of all on-line friendships and attitudes to the Internet

	Scepticism	Social orientation	Task orientation
Quality of all on-line	0,15	0,18	-0,14

Table 22: Multiple Regression Analysis – the quality of all on-line friendships vs. attitude to Internet (dependent variable: the quality of all on-line friendships)

	Estimate (B)	Standard Error	t	p
Constant	9,92	1,76	5,63	0,0000
Social orientation	0,03	0,02	1,93	0,0557
Scepticism	0,91	0,55	1,67	0,0973

Analysis of Variance

F	d.f.	p	R	R-squared
3,18	2;107	0,0453	0,24	0,06

Table 23: Analysis of Variance for the quality of all on-line friendships by social orientation and gender

F	d.f.	p	R	R-squared
1,22	3;163	0,3040	0,15	0,02

Type III Sums of Squares

	F	d.f.	p
Gender	0,01	1	0,9215
Social orientation	2,24	1	0,1366
Gender*Social orientation	0,20	1	0,6550

* interaction effect

Table 24: Analysis of Variance for the quality of all on-line friendships by scepticism and gender

F	d.f.	p	R	R-squared
2,12	3;106	0,1019	0,24	0,06

Type III Sums of Squares

	F	d.f.	p
Gender	0,04	1	0,8502
Scepticism	3,86	1	0,0521
Gender*Scepticism	0,40	1	0,5293

* interaction effect

Appendix 8

Gender and quality of on-line friendships

Table 1: Best off-line friendship - Comparison of quality of friendships by gender

Dependent variable (subscale)	F	d.f.	p	R	R-squared
Interdependence	7,83	1;318	0,0054	0,15	0,02
Breadth	2,32	1;318	0,1289	0,08	0,01
Depth	8,26	1;318	0,0043	0,16	0,03
Code	1,15	1;318	0,2840	0,06	0,00
Predictability	2,03	1;318	0,1552	0,08	0,01
Commitment	1,76	1;318	0,1862	0,07	0,01
Network	0,71	1;318	0,3987	0,05	0,00

Table 2: All on-line friendship - Comparison of quality of friendships by gender

Dependent variable (subscale)	F	d.f.	p	R	R-squared
Interdependence	3,14	1;165	0,0781	0,14	0,02
Breadth	0,20	1;165	0,6535	0,03	0,00
Depth	1,65	1;165	0,2011	0,10	0,01
Code	0,03	1;165	0,8736	0,01	0,00
Predictability	0,71	1;165	0,4012	0,07	0,00
Commitment	1,49	1;165	0,2246	0,09	0,01
Network	0,12	1;165	0,7324	0,03	0,00

Appendix 9

Questionnaire

At the beginning some demographic questions.

Please answer each question. For questions 1, 2, 3, 4 put the tick into the right square.

1. Where do you study?

   ☐ Psychology Department of UW
   ☐ PJWSTK
   ☐ SGH
   Other University/ School:
   　　　☐ Humanistic
   　　　☐ Technical
   　　　☐ Medical
   　　　☐ Art., Sport
   ☐ Nowhere

2. Age

   ....

3. Gender

   ☐ Male　　　☐ Female

4. Marital status

   ☐ Single　　☐ Married　　☐ Divorced　　☐ Widow/Widower

If you marked Married skip question 5.

5. Are you currently dating someone?

   ☐ Yes　　　☐ No

6. For how long have you been using the Internet? You can answer in years or in months.

   .... years

   .... months

7. How many hours in a week do you spend on the Internet?

   ....

8. How long are your session on the Internet usually? You can answer in minutes or in hours.

.... minutes

.... hours

Please reply to the following questions which are intended to show individual differences between people.

---

9. There are some situations in your life which make you feel embarrassed or shy. Please rate each item on the scale from 1 (extremely uncharacteristic) to 5 (extremely characteristic). Answer by marking the right number.

I feel tense when I am with people I don't know well

    1   2   3   4   5

I don't find it hard to talk to strangers

    1   2   3   4   5

I'm often uncomfortable at parties and other social functions

    1   2   3   4   5

I have trouble looking somebody right in eyes

    1   2   3   4   5

I like to be with people

    1   2   3   4   5

I prefer working with others rather than alone

    1   2   3   4   5

10. Please answer each question by marking the 'Yes' or the 'No' following the question. There are no right or wrong answers, and no trick question. Work quickly and do not think too long about the exact meaning of the questions.

Does your mood often go up and down?

☐ Yes   ☐ No

Are you a talkative person?

☐ Yes   ☐ No

If you say you will do something, do you always keep your promise no matter how inconvenient it might be?

☐ Yes   ☐ No

Do you ever feel 'just miserable' for no reason?

☐ Yes   ☐ No

Are you rather lively?

☐ Yes   ☐ No

Were you ever greedy by helping yourself no more than your share of anything?

☐ Yes   ☐ No

Are you an irritable person?

☐ Yes   ☐ No

Do you enjoy meeting new people?

☐ Yes   ☐ No

Have you ever blamed someone for doing something you knew was really your fault?

☐ Yes   ☐ No

Are your feelings easily hurt?

☐ Yes   ☐ No

Can you usually let yourself go and enjoy yourself at a lively party?

☐ Yes   ☐ No

Are all your habits good and desirable ones?

☐ Yes   ☐ No

Do you often feel 'fed-up'?

☐ Yes   ☐ No

Do you usually take the initiative in making new friends?

☐ Yes   ☐ No

Have you ever taken anything (even a pin or button) that belonged to someone else?

☐ Yes   ☐ No

Are you a worrier?

☐ Yes   ☐ No

Do you tend to keep in the background on social occasions?

☐ Yes   ☐ No

Have you ever said anything bad or nasty about anyone?

☐ Yes   ☐ No

Would you call yourself tense or 'highly-strung'?

☐ Yes   ☐ No

Do you like mixing with people?

☐ Yes   ☐ No

As a child were you ever cheeky to your parents?

☐ Yes   ☐ No

Do you worry too long after an embarrassing experience?

☐ Yes   ☐ No

Do you like plenty of bustle and excitement around you?

☐ Yes   ☐ No

Have you ever cheated at a game?

☐ Yes   ☐ No

Do you suffer from 'nerves'?

☐ Yes   ☐ No

Have you ever taken advantage of someone?

☐ Yes   ☐ No

Are you mostly quiet when you are with other people?

☐ Yes   ☐ No

Do you often feel lonely?

☐ Yes   ☐ No

Do other people think of you as being very lively?

☐ Yes   ☐ No

Do you always practice what you preach?

☐ Yes   ☐ No

Are you often trouble about feeling of guilt?

Do you sometimes put off until tomorrow what you ought to do today?

□ Yes   □ No

Can you get a party going?

□ Yes   □ No

11. Indicate how often you feel the way described in each of the following statements. Answer by rating each item on the scale from 1 (never) to 4 (often).

I can find companionship when I want it

1   2   3   4

People are around me but not with me

1   2   3   4

I feel alone although I don't want to

1   2   3   4

12. All of us need the company of other people to some extent. What about you? Please rate each item on the scale from 1 (strongly disagree) to 7 (strongly agree). Answer by marking the right number.

There is a special person who is around when I am in need

1   2   3   4   5   6   7

There is a special person with whom I can share my joys and sorrows

1   2   3   4   5   6   7

I have a special person who is a real source of comfort to me

1   2   3   4   5   6   7

My friends really try to help me

1   2   3   4   5   6   7

I can talk about my problems with my friends

1   2   3   4   5   6   7

My family really tries to help me

1   2   3   4   5   6   7

I get the emotional help and support I need from my family

1   2   3   4   5   6   7

I can talk about my problems with my family

1   2   3   4   5   6   7

My family is willing to help me make decisions

1   2   3   4   5   6   7

13. How many people in your local area do you socialize with at least once a month?

....

14. How many people outside your local area do you seek out to talk or to visit at least once a year?

....

15. There are many different reasons for using the Internet. Give a percentage (0 to 100%) for the time you spend on each of the following activities on the Internet.

Social correspondence via the Internet	....
Business matters, looking for information, shopping	....
Surfing the Web pages just for entertainment	....
Participating in the newsgroups, discussion groups	....
Chats, gadu-gadu	....
IRC	....
Web games, MUD	....
Files downloading, including music files or games	....

16. Do you look for on-line friends?

☐ Yes   ☐ No

17. There are many different opinions concerning on-line friendship. Please rate each item on the scale from 1 (strongly disagree) to 5 (strongly agree). Answer by marking the right number.

There are often misunderstandings in cyberspace because I cannot see or hear the others
                1   2   3   4   5

It is possible to express feelings adequately in cyberspace
                1   2   3   4   5

Getting to know each other via Internet is impossible
                1   2   3   4   5

It is possible to express emotion adequately in cyberspace
                1   2   3   4   5

On-line relationships are as important for me as real life relationships
                1   2   3   4   5

Real life contacts are necessary to develop strong, intimate relationship
                1   2   3   4   5

On-line relationships are enough to meet my social needs
                1   2   3   4   5

The following questions concern your personal relationships.

---

18. How many friends do you have?

....

19. How many of them:

you meet **only** outside the Net (off-line friendship)

....

you met outside the Net but you **also** meet on-line (off-line friendship)

....

you met outside the Net but you meet **only** on-line (off-line friendship)

....

you met on-line but you **mainly** meet outside the Net (on-line friendship)

....

you met and **mainly** meet on-line but you **also** meet outside the Net (on-line friendship)

....

you meet **only** on-line (on-line friendship)

....

Some of your friendships are more important for you than others. Please choose the most developed from your friendships (from your point of view) and answer the following questions.

20. How long did you know each other? You can answer in years or in months.

.... years

.... months

21. Answer each question by marking the 'Yes' or the 'No'.

you meet **only** outside the Net (off-line)

☐ Yes ☐ No

you met outside the Net but you **also** meet on-line (off-line)

☐ Yes ☐ No

you met outside the Net but you meet **only** on-line (off-line)

☐ Yes ☐ No

you met on-line but you **mainly** meet outside the Net (on-line)

☐ Yes ☐ No

you met and **mainly** meet on-line but you **also** meet outside the Net (on-line)

☐ Yes ☐ No

you meet **only** on-line (on-line)

☐ Yes ☐ No

22. Please rate the level of development of the chosen friendship by responding to the following items. Rate each item on scale from 1 (strongly disagree) to 7 (strongly agree).

There have been times when each of us has waited to see what the other thought before making a decision of some kind

1   2   3   4   5   6   7

This person and I have a great deal of effect on each other

1   2   3   4   5   6   7

We would go out of our way to help each other if it were needed

1   2   3   4   5   6   7

The two of us have little influence on each other's thoughts

1   2   3   4   5   6   7

Our communication is limited to just a few specific topics

        1   2   3   4   5   6   7

Once we get started we move easily from one topic to another

        1   2   3   4   5   6   7

I usually tell this person exactly how I feel

        1   2   3   4   5   6   7

I would never tell this person anything intimate or personal about myself

        1   2   3   4   5   6   7

I have told this person things about myself that he or she could not get from any other source

        1   2   3   4   5   6   7

Our communication stays on the surface of most topics

        1   2   3   4   5   6   7

We have special nicknames that we just use with each other

        1   2   3   4   5   6   7

I can get an idea across to this person with a much shorter message than I would have to use with most people

        1   2   3   4   5   6   7

We share a special language or jargon that sets our relationship apart

        1   2   3   4   5   6   7

I am very uncertain about what this person is really like

        1   2   3   4   5   6   7

I can accurately predict how this person will respond to me in most situations

        1   2   3   4   5   6   7

I can usually tell what this person is feeling inside

        1   2   3   4   5   6   7

I am very committed to maintaining this relationship

        1   2   3   4   5   6   7

This relationship is not very important to me.

        1   2   3   4   5   6   7

I do not expect this relationship to last very long

        1   2   3   4   5   6   7

This person and I do not know any of the same people

        1   2   3   4   5   6   7

We have introduced (face-to-face or otherwise) each other to members of each other's circle of friends and family

        1   2   3   4   5   6   7

We have overlapping social circles (on or outside of the Net)

        1   2   3   4   5   6   7

If you have filled in the above section for an on-line friendship, you can skip the rest of the questionnaire. You can also skip the rest of the questionnaire if you have NO on-line friendships.
If the friendship you have rated above is NOT an on-line friendship, rate your most developed on-line friendship (including friendship that have started on-line but have since migrated to other settings).

23. How long did you know each other? You can answer in years or in months.

       .... years

       .... months

24. There are different kinds of on-line friendship. Answer each question by marking the 'Yes' or the 'No'.

you meet **only** on-line

☐ Yes ☐ No

you met and **mainly** meet on-line but you **also** meet outside the Net

☐ Yes ☐ No

you met on-line but you **mainly** meet outside the Net

☐ Yes ☐ No

25. Please rate the level of development of your friendship by responding to the following items. Rate each item on scale from 1 (strongly disagree) to 7 (strongly agree).

There have been times when each of us has waited to see what the other thought before making a decision of some kind

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

This person and I have a great deal of effect on each other

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

We would go out of our way to help each other if it were needed

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

The two of us have little influence on each other's thoughts

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Our communication is limited to just a few specific topics

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Once we get started we move easily from one topic to another

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I usually tell this person exactly how I feel

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I would never tell this person anything intimate or personal about myself

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I have told this person things about myself that he or she could not get from any other source

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Our communication stays on the surface of most topics

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

We have special nicknames that we just use with each other

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I can get an idea across to this person with a much shorter message than I would have to use with most people

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

We share a special language or jargon that sets our relationship apart

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I am very uncertain about what this person is really like

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I can accurately predict how this person will respond to me in most situations

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I can usually tell what this person is feeling inside

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I am very committed to maintaining this relationship

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

This relationship is not very important to me

1	2	3	4	5	6	7

I do not expect this relationship to last very long

1	2	3	4	5	6	7

This person and I do not know any of the same people

1	2	3	4	5	6	7

We have introduced (face-to-face or otherwise) each other to members of each other's circle of friends and family

1	2	3	4	5	6	7

We have overlapping social circles (on or outside of the Net)

1	2	3	4	5	6	7