14

Are "Friends" Electric?

Why Those with an Autism Spectrum Disorder (ASD) Thrive in Online Cultures but Suffer in Offline Cultures

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"The Internet is an essential means for autistic people to improve their lives, because it is often the only way they can communicate effectively."

(Blume, 1997)

"I never knew I could talk so much!! Normally I don't speak much … but with the computer I can be quite articulate. But I know if I met people I chat to on here – I wouldn't be able to speak as I do on the computer."

A post from a Facebook user with ASD (2013)

What is Autism Spectrum Disorder (ASD)?

Autism spectrum disorder (ASD) is defined by the American Psychiatric Association as a persistent deficit in social communication and social interaction across multiple contexts combined with restricted, repetitive patterns of behavior, interests, or activities (DSM-5; APA, 2013). ASD is identified in around 1% of the population, affecting around four times as many males as females. ASD is a lifelong condition and includes individuals who are low functioning (classic autism) and high functioning (Asperger's syndrome). One prominent theory of ASD proposes that the social communication and interaction difficulties in ASD are a result of a deficit in "empathizing" and restricted and repetitive interests are related to preserved or enhanced "systemizing" (Baron-Cohen, 2002, 2003, 2009).

Empathizing

Baron-Cohen defines empathizing as the drive to identify a person's thoughts and feelings and to respond to these with an appropriate emotion. Empathizing can be assessed through self-report questionnaires, such as the Empathy Quotient

(Baron-Cohen & Wheelwright, 2004). The Empathy Quotient asks participants to agree or disagree with statements such as "I can tell if someone is masking their true emotion" and "I tend to get emotionally involved with a friend's problems." Behaviorally, empathizing can be assessed by the Reading the Mind in the Eyes Test (RMET; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). The RMET requires individuals to look at the eyes (the rest of the face is not seen) of a series of images and decide which of four words best describes the thoughts or feelings of the person. Whether assessing empathizing by questionnaire or a behavioral measure, a consistent pattern of results is typically found. First, females outperform males and second, males outperform those with ASD (whether male or female). Deficits in empathizing are argued to underpin the deficits in social communication and interaction found in ASD. A great deal of socially relevant information is expressed through the face during face-to-face interaction and difficulties in processing this information impact upon effective social communication and interaction. An emotional expression typically indicates how someone is feeling (e.g., feeling happy if you are smiling – though there are exceptions). Difficulties in processing the emotions of others result in a deficit in understanding their state of mind, that is, their thoughts and feelings (termed "theory of mind").

Systemizing

Whereas empathizing is defined in terms of the social world, systemizing is defined in terms of the non-social world. Systemizing is defined as the drive to analyze or construct a system. Systems can be broadly defined (technological systems, mechanical systems, natural systems, abstract systems) but tend to be highly predictable and follow rules (unlike people). Systemizing can be assessed by self-report questionnaire (Systemizing Quotient; Baron-Cohen, Richler, Bisarya, Gurunathan, & Wheelwright, 2003). The Systemizing Quotient asks participants to agree or disagree with statements such as "If I were buying a car, I would want to obtain specific information about its engine capacity" and "If there was a problem with the electrical wiring in my home, I'd be able to fix it myself." Behaviorally, systemizing can be assessed by tasks such as the Intuitive Physics Test (Lawson, Baron-Cohen, & Wheelwright, 2004), which asks 20 problem-solving questions based around physics/engineering principles. Systemizing is the drive to understand such predictable, rule-based systems and has been found to be high in those studying computer science, mathematics, and physics (Baron-Cohen et al., 1998). Those with ASD can have preserved or enhanced levels of systemizing. Again, a consistent pattern of results has been found when studying systemizing skills. First, males tend to outperform females, and second, those with ASD (whether male or female) tend to outperform males. A focus upon technology as a restricted and repetitive interest in ASD has been reported, and high systemizing skills are argued to underpin competence with technology (as well as other predictable systems). Much anecdotal evidence suggests that those with ASD have a drive to use technology, which can be seen as an aspect of strong systemizing (Moore & Calvert, 2000; Stromer, Kimball, Kinney, & Taylor, 2006). It has also been argued that the methodical orientation and attention to detail aspects of systemizing make people with ASD ideal to work within IT environments (Saran, 2008). Indeed, a famous author with ASD argues that she thinks much like a computer thinks: "My mind is

similar to an Internet search engine that searches for photographs. I use language to narrate the photo-realistic pictures that pop up in my imagination" (Grandin, 2000, p. 14).

ASD and Social Media

We therefore have a pattern of social (empathizing) and non-social (systemizing) abilities which indicates:

- Empathizing is greater in females than in males, who, in turn, are better at empathizing than those with ASD (females > males > ASD).
- Systemizing is greater in ASD than in males, who, in turn, are better at systemizing than females (ASD > males > females).

Those with ASD are characterized as having a deficit in social communication and interaction combined with a strength in using systems, such as technological systems. One of the greatest advances of the twenty-first century has been the development of the Internet for the vast majority of the population within the industrial world. The modulation of communication via the Internet has spawned a wealth of research. Of particular interest to this chapter, the Internet has allowed for communication between people who are not physically present, that is, not face to face. Of course, writing letters and the telegram allowed for this centuries ago; however, the Internet affords far greater accessibility and immediacy for non-face-to-face communication. Internet-based communications are also used far more frequently, on many occasions being the most frequent way people communicate with each other. The telephone, too, allows for non-face-to-face communication, although there is still a vocal presence. The Internet has allowed for mass communication to occur without the need for a face-to-face social-emotional presence, a phenomenon termed social media. Social media refers to any Internet site that allows social interaction, including social networking sites such as Facebook (O'Keeffe & Clarke-Pearson, 2011). Given that those with ASD have difficulties in social-emotional processing and strengths in using technological systems, how those with ASD use social media is an important question. Within social media communication, can systemizing strengths compensate for empathizing weaknesses?

Social media has long been argued to be "affect-limited" (Picard, 1998), that is, lacking in ability to express or recognize emotion. Historically the vast majority of online communication has been typed from one person to another. This removes the social-emotional cues, such as facial expression, that those with ASD can have difficulty processing. Thus the affect-limited nature of social media can level the playing field for those with ASD to communicate. Clearly, when communicating solely through typing online, you cannot process someone else's facial emotion whether you have ASD or not. Shore (2001) also argues that computers are often particularly well suited for those with ASD as they provide interactive consistency. A computer has the same response for a given input, so there is no body language or tone of voice messages that need to be decoded. Thus, the interactive consistency could play to systemizing strengths and the affect-limited nature of the communication could ameliorate the empathizing deficits in ASD.

Social Media and Social Capital

This is significant and there is evidence within the general population that social experiences are increasingly occurring online (Livingstone, 2008). What is more, failure to master social media may lead to social exclusion. For many teenagers, having a social network presence is essential to having a social life. As one social networker put it several years ago, "if you're not on MySpace, you don't exist" (boyd, 2007). Facebook in particular can expand and strengthen social networks, and enables members to maintain older friendships that would otherwise have faded away (Young, 2011). For example, if you are not on Facebook and everyone is arranging a social activity through Facebook, you are more likely to be excluded. As a consequence, Facebook use has been found to predict "social capital" (Donath, 2007; Ellison, Steinfield, & Lampe, 2007). Social capital broadly refers to the resources accumulated through the relationships among people. At least two types of social capital have been identified: "bridging social capital," sometimes referred to as "weak ties," consists of diffuse networks of relationships from which people could potentially draw resources (distribution lists, photo directories); and "bonding social capital," sometimes referred to as "strong ties," consists of family and close friends, who might be in a position to provide emotional support (see Steinfield, Ellison, Lampe, & Vitak, 2012, for an overview). Importantly, online social capital extends to the offline world (Ellison et al., 2007; Ellison, Lampe, Steinfield, & Vitak, 2011). This raises the intriguing possibility that mastery of social media could reduce the ASD deficits seen in empathizing in an offline context. The epigraph at the beginning of this chapter indicates that those with ASD can use social media effectively; however, this does not extend to face-to-face communication. The remainder of the chapter will explore this contention.

Who Uses Social Media?

Google executive Eric Schmidt has proclaimed that the entire Earth will be online by 2020 (Gonzales, 2013; Schmidt, 2013). Clearly he may have a vested interest in making such predictions, but the data suggest that around 80% of North Americans are already online, as are two-thirds of Europeans and Australians. South America and the Middle East have around 40% Internet penetration and Africa and Asia around 20–25% (Internet World Stats, 2013). So not the entire Earth yet, but the year-on-year increases in the proportions of population coming online suggest most people on Earth will soon be online. Either way, there are literally billions of people online. So what are they doing? In a major survey of worldwide Internet use, ComScore (2014) report four key findings:

1 Social networking is the most popular online activity worldwide (85% of people who are online report some level of social networking).
2 The importance of Facebook cannot be overstated (3/4 of social networking).
3 It is not just young people using social networking anymore – it is all age groups.
4 Mobile devices are fueling this "social addiction."

In May 2013, Facebook statistics reported that there were more than a billion active Facebook users, a figure which increased to 1.3 billion in March 2014 (Geekwire, 2013; Statisticsbrain, 2014), including more than half of the population of the United States (Internet World Stats, 2013). The statistics highlighted that in the United States, there were slightly more female than male Facebook users, and 25–34 was the most popular age range (Socialbakers, 2014). Gender is argued to be an important variable when examining computer usage (Brosnan, 1997, 1998), with some research indicating that females are more likely to use the Internet for communication, while males are more likely to use the Internet for information-seeking (Jackson, Ervin, Gardner, & Schmitt, 2001). This may be pertinent as around four times as many males as females are diagnosed with ASD (APA, 2013). Facebook groups based around specific interests exist as forums for communication, and in research conducted on undergraduates from seven United Kingdom universities, we have found that males belong to 19 Facebook groups on average, and females belong to 15 Facebook groups on average (Joiner et al., 2006; Joiner, Brosnan, Duffield, Gavin, & Maras, 2007; Joiner et al., 2012, 2013).

Friends can be identified within Facebook, and Facebook supports 150 billion friend connections. Facebook is clearly a prolific resource for supporting social communication and interaction within an online context. As an aside, Robin Dunbar argues that the human brain has evolved to maintain around 150 social relationships effectively ("Dunbar's number"; Dunbar, 2010). These social relationships are personalized relationships that are reciprocal and based around general obligations of trust and reciprocity, akin to bonding social capital. Dividing the number of Facebook friends by the number of Facebook users gives an average number of Facebook friends per Facebook user of 141.5, which is fairly close to Dunbar's number. Numbers of reported Facebook friends can be much higher than 150 (e.g., Edison, 2014); however, Dunbar's number refers to "bridging social capital" or "strong ties." Interested readers are referred to Dunbar's (2010) book, *How Many Friends Does One Person Need?*.

Do People with ASD use Social Media?

Since the 1990s, people with ASD have been communicating via chatrooms, email lists, and online bulletin boards (Biever, 2007). Those with ASD have been early adopters of online communication forums. Early analyses of the impact of online communication for those with a social communication deficit were startling in how beneficial online communication was found to be. For example, Singer (1999) argued that "the impact of the Internet on autistics may one day be compared to the spread of sign language among the deaf" (p. 69). Blume (1997), too, argued that "for many autistics the Internet is Braille." Both of these analogies highlight how those with impaired communication skills are enabled to communicate online. Blume continues: "autistic communication could be comparable to written communication," to suggest that the written style of communication afforded by Internet-based communication is preferable for those with ASD. Another famous author with ASD writes: "When I need to explain something at a level of complexity for which spoken words evade me, I still run off to the computer and let my fingers talk" (Williams, 2005, p. 252). Thus, on some occasions at least, the writing format supported by social media proves beneficial to those with ASD.

A second key aspect of written communication is the inherent delay, when compared to face-to-face communication. Internet-based communication allows for a delay in response that is almost never allowed in real life. Darius (2002) writes: "there is no such thing as adequate delayed social reactions. One is either quick enough to keep up, or one is weird and socially disabled" (p. 25). Again, a great deal of research has been undertaken on comparing synchronous and non-synchronous communication (Walther & Parks, 2002). It would seem that this is particularly pertinent for those with ASD. The reason that "autistic communication could be comparable to written communication" may be the additional time that is available to reflect upon what is being communicated. The removal of the immediate time pressure to respond may allow those with ASD to communicate more effectively.

Thus, the Internet allows communication between group members for whom social aspects to communication have historically been a hindrance (Dekker, 2006, cited in Davidson, 2008). An interesting issue to emerge from this is that those with ASD can communicate with each other. The Internet has facilitated the formation of a group identity (amongst those typically described as having communication difficulties). Singer (1999) argues that "the Internet has promoted the emergence of new ways of self-identification for autistics" (p. 64). The Internet provides a means to develop and maintain relationships for people with ASD (Jones & Meldal, 2001). This facilitation of online social interaction accords with Singer's (1999) claim that the Internet is the ideal social environment for those with ASD. Singer (1999) argues that those with ASD now have their own country, "a cybercountry – and it's perfect" (p. 65).

The affect-limited nature of online communication is therefore "ASD-compatible," providing a "level playing field" for communication. This, in turn, allows for a "neurological pluralism," that is, equal access for all, irrespective of any neurological differences (Blume, 1997; Brownlow & O'Dell, 2002), as well as the formation of a group identity. The Internet has therefore begun to challenge stereotypes surrounding the competence of people with ASD to communicate effectively. Dekker (2006) notes that "autistic people often report they have few problems communicating with and understanding people 'of their own kind'" (cited in Davidson, 2008). The question then arises as to whether those with ASD can access and use social networking sites, such as Facebook, to communicate with those who do not have ASD.

Do People with ASD use Facebook?

How those with ASD use Facebook forms the basis of the remainder of this chapter and our initial empirical work in this area. Autism-related charities tend to have a Facebook presence. The number of Facebook users who have indicated they "like" these Facebook groups provides an index of usage and interaction with the group. For example, as of March 2014, Autism Awareness (USA) had 859,000 likes and 255,000 interactions/week; Autism Speaks (USA) had 1.1 million likes and 22,000 interactions/week; and the National Autistic Society (UK) had 43,000 likes and 2,000 interactions/week. So there is some evidence that those with an interest in ASD are using Facebook. In addition there is a huge range of user-run Facebook groups based around ASD.

Also, anecdotally, a mother of a young man with ASD emailed us as follows (with permission to reproduce the email):

> I sometimes send my 14 yr old son a message on facebook to say thank you when he has helped me with something around the house, usually after much persuasion from me and complaining from him! He seems to respond positively [to Facebook comments] (last response was "you know normal conversation isnt too bad!") and then when I see him next he is more open to a hug. However if I'd say to him verbally, he rarely responds as is already thinking about something else. I think its because its more permanent when written down and there for longer. If verbal its over quickly and im never sure I have his full attention. I can also send him reminders on facebook e.g. homework, music practice, feed pet, write birthday card. This avoids an angry response as we are not interrupting him, I only need to do once as I know he's seen it … I have heard from other families of teenage boys with aspergers that they too use email, text and messaging with their child in the same house as they get a better response.

Thus, Facebook can be used on occasion in preference to face-to-face conversations in families who are in the same house together. This quote reflects the comparisons above between autistic communication and written communication. Based on this, our aim was to explore how those with ASD used the primary social networking site, Facebook, and to explore the extent to which empathizing was evident in this online environment, when it has been found to be deficient in the offline environment. To do this we explored open message boards within Facebook. As this is the first time this type of research has been undertaken, some methodological issues need to be addressed.

Ethics

We carefully considered the ethical implications of our studies and conformed to the guidelines produced by the British Psychological Society (BPS, 2009). Facebook sites included open access message boards. Open access message boards are generally perceived and acknowledged by users and members as being in the public domain, freely available to anyone with access to the Internet (Paccagnella, 1997). In posting a message there is "implied license to read or even archive the information it contains" (Mann & Stewart, 2000, p. 46). As such, it was not considered necessary to seek consent from the website manager or the individuals posting and responding to messages on the board (see Rodham & Gavin, 2006; Gavin & Rodham, Chapter 6 in this volume). In accordance with the BPS Ethical Code of Conduct (2009), we ensured that the anonymity of the site and the individuals who posted and/or responded to messages was maintained. We did this by removing any references to names (of the group or community or posters) and places in the quotes we have presented. We also typed the quotes we have presented below into Google to establish that they were not searchable. We also sought and received approval from our university ethics committee.

Research Strategy

The research focuses upon Facebook users who self-identify as having ASD. This research is preliminary and we have no way of confirming the diagnosis. In addition we do not know whether those with ASD who use Facebook are representative of the

ASD population. We will refer to those who self-identify as having ASD as the ASD group. However, these important provisos need to be borne in mind when considering these pilot data.

Is Online Communication Preferable to Offline Communication for Those with ASD?

The literature above suggests that those with ASD may exhibit a preference for online communication. Our first analysis sought to identify if this was the case and, if so, what those with ASD thought the reasons for this were. We therefore analyzed the posts from an ASD Facebook group (community). This group asked for responses to a specific question: *How has your ASD changed since having the freedom to talk to people online instead of face to face?*

There were 46 respondents to this question who self-identified as having ASD. Analysis of these posts revealed five categories of response, illustrated in Figure 14.1.

The most popular response (26/46 = 57%) was that online communication was easier than offline communication, face to face). Examples from this category include:

> Although I've learned to talk to people face-to-face, it's still ten times easier and more comfortable to talk on-line.

> I normally can talk to people on facebook but don't face to face most of the time…

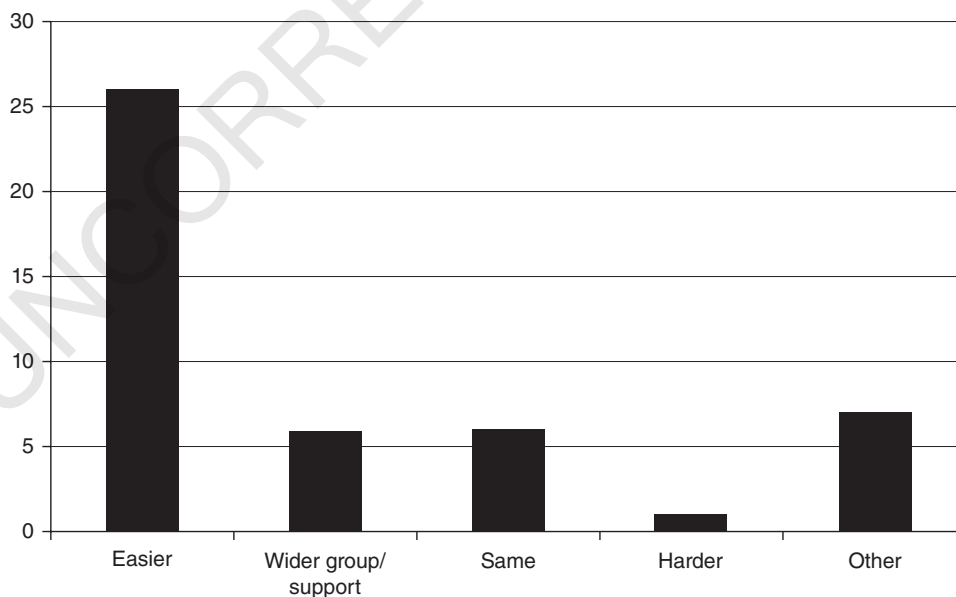> Its easier online as no 1 gets to see your nervousness in action.

Figure 14.1 Responses to online versus face-to-face communication.

Within these responses the limited affect of reduced cues was frequently cited as a reason why online communication was easier. For example:

> When talking online I feel so much more ease and a lot less pressure to understand social cues.

> It is easier to talk behind a screen, because I don't have to read any gestures, just smileys. :-)

This last point is important. We have found that simple stylized smileys are recognized better by people with ASD compared to controls (Brosnan, Chapman, Johnson, Grawemeyer, & Benton, 2013). These very clear expressions of the basic emotions are recognized and used by those with ASD. It is the more subtle and complex emotions that can be problematic to recognize by those with ASD. Also, one respondent reported that they missed social cues during online communication:

> However … online it frustrates me when I don't know what's going on with the other person … no tone, no facial expression, and also being disconnected all the time.

Thus, while the affect-limited nature of the reduced social cues was beneficial in leveling the playing field for many with ASD, there was least one person with ASD who felt they benefited from the face-to-face social cues.

The second major theme that emerged was the benefit of not having to respond immediately. Having the time to reflect upon communication was frequently seen as beneficial. For example:

> On-line is better for the same reason why I don't use a telephone. I need time to think through my replies before typing or talking. On-line gives me the freedom to do that.

> I like the online stuff because I have the freedom to take the time I need to respond, I can read better than I listen, so I misunderstand less …

> I find it easier to reflect inwardly and see what it is I think or feel before I type into the Facebook posting.

Despite the perceived benefits of online communication over offline communication, a major limitation was also acknowledged. An emergent theme was the inability to generalize the effective online communication to the offline world (see epigraph at the beginning of this chapter). For example:

> … It's much easier for me to talk online, email, text. Problem is, I get too comfortable with it and it makes it harder for me to [*talk to*] people face to face.

> … it's better to talk online … but the internet does not help in learning how to deal with people face to face – and for me at least doesn't make me feel less lonely.

> Yes it's easier to socialize online, though I still have a lot of trouble in everyday life, I keep very much to myself offline …

Thus, despite the perceived benefits of online communication (reduced social cues, non-synchronous timing), the ability to extend this beyond the online world remains an issue for those with ASD. This represents a fascinating forum for future research – how do we extend the benefits for communication in those with ASD from the online

world to the offline world? Anecdotal evidence suggests it can be done (Schultz & Jacobs, 2012), and communicating via Facebook or avatars through to communicating face to face via Skype represent interesting variants on the degree of a physical/ digital presence to the online communication.

Also important to note are the other categories represented in Figure 14.1. Six additional respondents preferred the online communication environment to the offline world. This was not because they found communicating online easier but because it facilitated access to similar people (others with ASD). This is an important function of many online environments, and is a separate advantage to easier online communication. This also highlights a crucial point. The posts from this analysis emanated from a group within which everyone self-identified as having ASD. Future research needs to clarify that perceived benefits in online social-emotional communication are appreciated by the recipients of the communications – including both recipients with and without ASD. In addition, six participants also reported that they found online and offline communication comparable and one respondent found online communication harder than offline communication. (The "other" category included responses such as "good question"). It is important to remember that the ASD group are a diverse group with differing strengths and weaknesses. For the majority, however, the online context does provide an environment which enables communication that is hindered within the offline world. Having established a preference for online communication in those with ASD, our second question concerned the social-emotional content of the communication.

The Expression of Basic Emotions on Facebook by Those with ASD

This second study sought to explore whether those with ASD expressed emotional content in an online context in a manner that was comparable to those without ASD. The literature above highlights that in the offline world, ASD is characterized as deficits in social-emotional communication. However, in the online world, anecdotal evidence (see the epigraph at the head of the chapter) and our first study (above) suggest those with ASD may be able to communicate effectively. So the question arises as to the social-emotional content of the online communication of those with ASD. It could be that in the online context, communication is indistinguishable from communication with those without ASD, that is, communication contains comparable levels of social-emotional content. Conversely, it could be that the online context allows those with ASD to communicate effectively but without the social-emotional content, consistent with the deficits in empathizing described in the offline world.

Our second study therefore looked at the posts of those within an ASD Facebook group. We wanted to explore the use of emotionally laden language in the posts of those who self-identify as having ASD (we were unable to confirm a clinical diagnosis). For this study we focused upon the six basic emotions that have been found to be consistent across time and cultures, namely, happiness, surprise, fear (being afraid), anger, disgust, and sadness (Ekman & Friesen, 1969). These basic expressions of emotion are communicated facially and we are extending this to written communication.

There is a personality construct called "alexithymia," which is characterized by the subclinical inability to identify and describe emotions in the self in any modality, including text. Studies of alexithymia have attempted to identify whether there is a general cross-modality alexithymia in ASD as opposed to a specific deficit in processing facial emotions. Bird et al. (2010), for example, argue that it is alexithymia within those within ASD that underpins the deficit in empathizing. Thus, the deficit is in the inability to identify and describe emotion in the self, not simply a facial emotion recognition deficit in the offline world. We would therefore predict a lack of emotionally laden words within the posts of those with ASD if the online world is consistent with the offline world.

An analysis of all the emotionally laden words in English has been undertaken. Baron-Cohen, Golan, Wheelwright, Granader, and Hill (2010; see also http://www.jkp.com/mindreading/) identified all the emotionally laden words from the English electronic thesaurus in Microsoft Word and clustered them into emotional categories. The six basic emotions are listed in Figure 14.2. "Comfortable," "calm," "amused," etc. were therefore all counted as an expression of the "happy" emotion. The levels refer to when these words typically enter the vocabulary, that is, Level 1 represents the first words typically used. Typically, 4- to 6-year-olds have around 40 emotional words they use consistently and correctly (Level 1); this doubles to around 80 in 7- to 8-year-olds (Level 2), doubles again to around 160 in 9- to 10-year-olds (Level 3), and almost doubles again to just over 300 in 11- to 12-year-olds (Level 4), after which there are minor increases in 13- to 14-year-olds (Level 5) and 15- to 16-year-olds (Level 6). Thus, particularly for the basic emotions, the vast majority of the emotion words in English are used and understood by 12 years of age. There is good evidence that children with ASD also understand the words for basic emotions by the age of 12; for example, they can reliably pair the word "happy" with a picture of a smiling face (Grossman, Klin, Carter, & Volkmar, 2003). We extended this analysis to account for a unique feature of textual representations of emotions found in Facebook and other online communication, namely emoticons. Emoticons provide a visual representation of emotion using keystrokes, almost exclusively based upon stylized facial expressions, for example :) as happy and : (as sad. Although those with ASD can have deficits in recognizing facial emotions (compared to control groups), we have found that those with ASD are better at recognizing emoticons than control groups (Brosnan et al., 2013).

We then identified a comparison group that had a similar number of members, post activity, and age (teenagers) and sex profile (equal numbers of males and females). We identified a group that formed around a physical condition, which was a cancer group, to compare with our ASD group. The ASD group had 45 active members and we analyzed the most recent 108 posts, of which 48% contained emotion words. The cancer group had 41 active members and we analyzed the most recent 102 posts, 49% of which contained emotion words. The presence of emotion words was judged by two independent judges and any disagreements were resolved through discussion. As the methodology was quite explicit, there were very few disagreements as to whether one of the words listed in Figure 14.2 was present or not. Also of interest was whether the emotion words were being used appropriately. Both groups used the emotion words appropriately. Indeed, judges felt they could not distinguish whether the posts were from the ASD or cancer group, unless reference was made explicitly to the condition.

Emotion	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Happy	Comfortable Glad Happy Joking Lucky Merry Safe Teasing	Calm Cheeky Cheered Delighted Enjoying Fine Grateful Overjoyed Playful Pleasure Proud Relaxed	Amused Content Easy-going Mischievous Positive Relieved	Carefree Casual Sociable Triumphant Unconcerned	Jubilant	Exhilarated
Surprised	Surprised	Shocked	Dazed Horrified Startled Wonder	Appalled	Scandalized	
Afraid	Afraid Worried	Desperate Nervous Threatened	Cowardly Dreading Frantic Jumpy Panicked Terrified Watchful	Daunted Disturbed Intimidated Shaken Uneasy Vulnerable		Consternation Cowed Discomforted
Angry	Angry Grumpy Moaning Moody	Annoyed Complaining Furious Wild	Displeased Explosive Frustrated	Bitter Discontented Exasperated Heated Indignant	Miffed Needled	

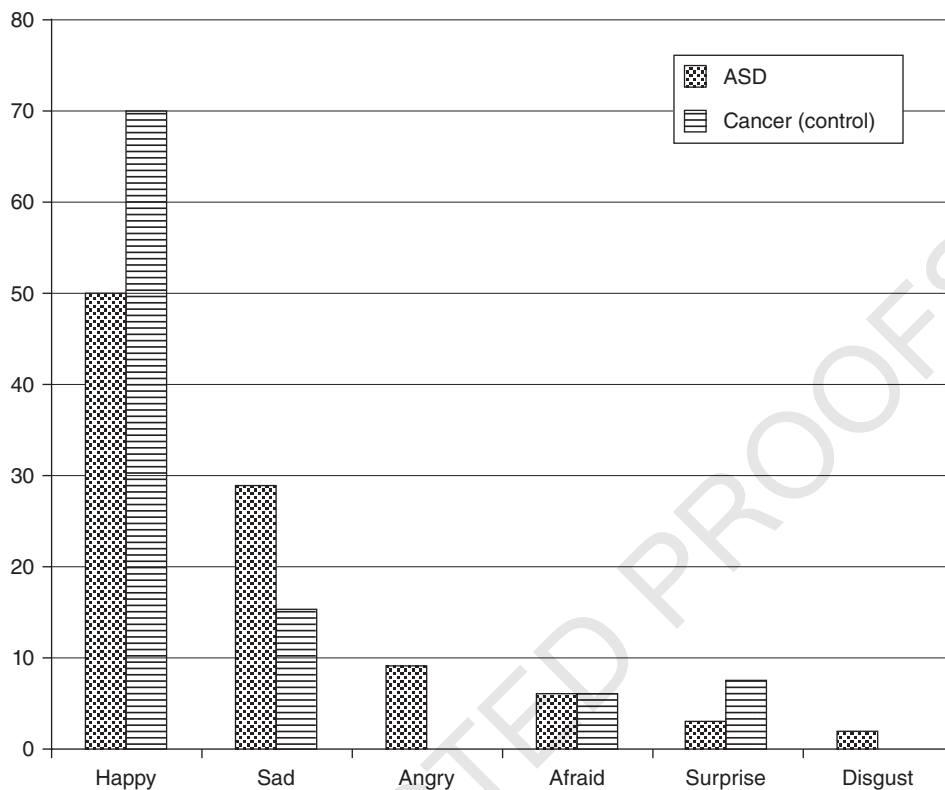**Figure 14.2** Emotion words for each basic emotion.

Figure 14.3   Proportions of basic emotions expressed in Facebook posts from ASD and cancer (control) groups.

Having identified that both groups used emotion words appropriately in almost half of their posts, we then analyzed *which* emotion words were used by each group. The percentages of each basic emotion expressed are highlighted in Figure 14.3. For both the ASD and cancer (control) groups, happiness was the most frequently expressed emotion, followed by sadness. The other four basic emotions were expressed relatively rarely (anger, fear, surprise, disgust; note there are fewer words within the disgust category, which may have affected these findings). There were many similarities between these two groups in terms of the amount and content of emotional expression within Facebook posts. However, there was also a trend for those within the ASD group to express less happy and more sad emotions than the cancer (control) group.

While it may seem unusual that those discussing cancer are expressing more happiness than those with ASD, there is research to suggest that the aim of support groups such as these is to provide *positive* support (Rodham, Gavin, Lewis, St. Denis, & Bandalli, 2013). We therefore ran a third study to compare an ASD Facebook group with a control group that did not have a condition. Again we identified a group based upon having a similar number of active members with a similar age and sex demographic profile. The best match was a church-based group of young people who were all located in the same city in the United Kingdom. The same analysis as described

Happy & sad emojis are most commonly used though cuz easier to type…

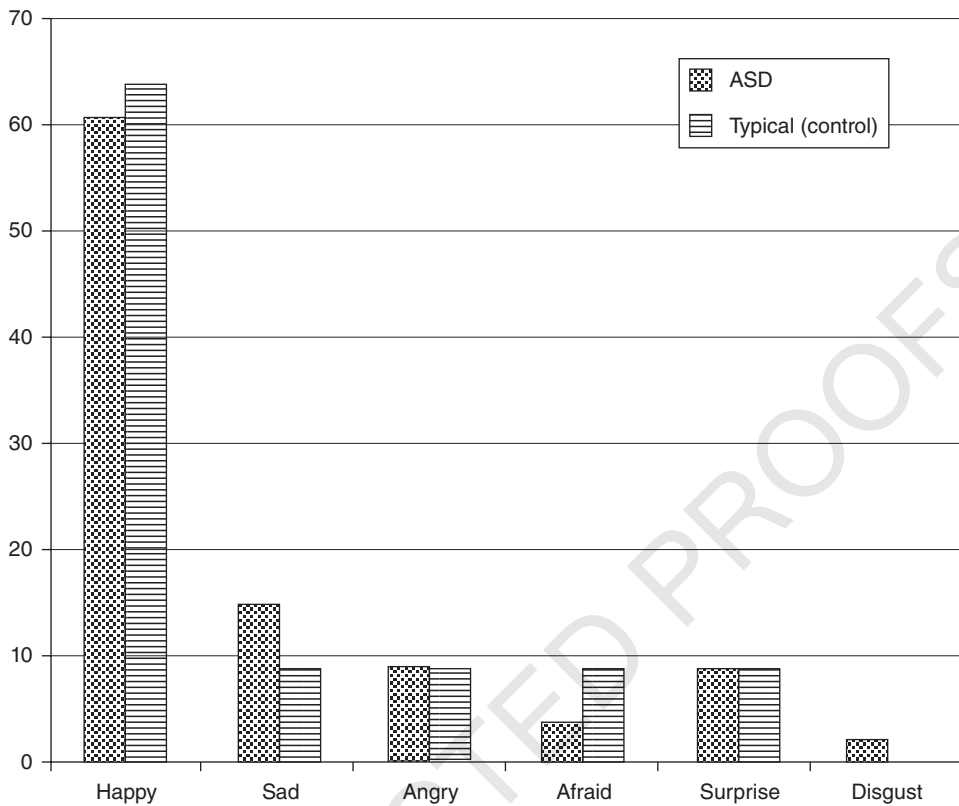*+ support group influences the amount of positive emotional words?*

Figure 14.4 Proportions of emotions expressed in Facebook posts of ASD and typically developing (control) groups.

above was conducted for the last 100 posts of 2012 for the ASD and control group. In addition we analyzed the structure of the posts, which averaged two to three responses per post, suggesting that both groups were comparably interactive in their Facebook posts. In these posts, the ASD group used emotion words in 35% of their posts, considerably more than the control group, which used emotion words in 12% of their Facebook posts. As with the first study, we examined which emotion words were being used (noting the small numbers for the control group). Again "happy" was the dominant emotion being expressed by both groups. The other five basic emotions were all expressed fairly comparably and to a far lesser degree. The overriding sense of the data is how similar the proportions of emotions used are by both groups, as illustrated in Figure 14.4.

In summary, those with ASD used basic emotion words appropriately when they were online. Moreover they expressed the same pattern of emotions as the control groups (e.g., typical teenagers). In addition, those with ASD expressed emotion comparably to those with other conditions (cancer) and more frequently than those from the typically developing control group. This quantitative analysis indicated that emotion was being used within online communication by those with ASD. Our next study explored qualitatively whether there were examples of empathy being displayed appropriately in online communication by those with ASD.

The Expression of Empathy on Facebook by Those With ASD

The assessments of empathizing described earlier are not appropriate for an analysis of empathic interaction with others in an online environment. The self-report questionnaires and emotion recognition tasks described above assess empathizing without empathic interaction with another person. Empathy, however, exists in relation to other people. It is the understanding of emotions in others and responding appropriately that underpins empathy. The finding that those with ASD use emotion words is not necessarily the same as those with ASD being empathic. Empathy is an inherently social activity. To *be* empathic involves responding to another. We wanted to ask: Do those with ASD respond to others empathically? To answer this question, we analyzed how people with ASD interact on Facebook. Specifically, we investigated whether there was any evidence of empathic interactions with other people on Facebook.

Our approach to the analysis of empathy was to use the framework developed by Pudlinski (2005), who argued that "doing empathy or sympathy is a mutual achievement." As we wanted to analyze the active process of empathy within the Facebook environment, we identified the perspective of "doing empathy" as the appropriate framework for analysis. Pudlinski (2005) defines the practice of empathy as "demonstrating an understanding of another person's situation and/or feelings and communicating that understanding back to the person so they feel understood" (p. 267). Within this framework there are eight different methods for "doing" empathy: (1) emotive reactions (e.g., "oh no"); (2) assessments (e.g., "that's not fair"); (3) naming another's feelings (e.g., "you're getting clobbered"); (4) formulating the gist of another's troubles (e.g., providing a short summary of their feelings); (5) using an idiom (e.g., "just take each day as it comes"); (6) expressing one's own feelings about another's troubles (e.g., "sorry to hear that"); (7) reporting one's own reactions (e.g., "I'd be pretty angry about that too"); and (8) sharing an experience of similar feelings (e.g., "I feel that way too sometimes").

These eight methods differ along four dimensions:

A   Depth of understanding of the other's trouble.
B   Depth of understanding of the other's feelings.
C   Ability to normalize the other's feelings.
D   Amount of shared similarity of feelings.

Identification of the empathy practice (i.e., 1–8 above) informs an understanding of the dimensions of empathy (i.e., A–D above). For example, the practice of emotive reactions (1 above) indicates a minimal practice of dimension A, or the practice of sharing an experience of similar feelings (8 above) indicates all four dimensions of empathy are being practiced. Our fourth study looked at an ASD Facebook group (a "Facebook community") to explore if there was evidence of the practice of empathy in this online context. We analyzed the most recent 100 threads of 37 active users. The results showed that 89% posted between one and five times, 5.4% 6 to 10 posts, and 5.4% 11+ posts. Of the 37 people, 14 were male and 23 were female. Twenty-two from the 37 (59%) active posters with ASD displayed empathy under Pudlinski's framework. Below are some selected posts from those with ASD.

In response to a post about being anxious about a test:

just relax and try to keep ur mind focused and clear … which i know is difficult … when i did my test ill let you into a little secret … i was in auto mode and i had songs running through my head and it made me relax … i had Mcfly Party Girl on a loop in my head and it worked … and i passed my test first time!

In response to concern about getting frustrated over every minute detail:

Don't worry. It's normal. Trust me, I cry if I miss the bus.

In response to a post about being bullied at school:

It is wrong that people treat you that way. I know it doesn't seem like it now but it will get better.

I know how you feel man. Except for being spat on, all those things you have mentioned have happened to me too …

I wish there was a way I can help!!

Sharing an experience of similar feelings is most evident in these examples, in addition to an example of an assessment (first response to being bullied post). The final example highlights that an empathic offering of help does not fit neatly into the framework. Thus, this framework provides a useful way to analyze empathic interactions within Facebook, though minor amendments (such as offers of support) need to be incorporated. In summary, there is evidence that the four dimensions of empathy identified by Pudlinski are being practiced by those with ASD in an online context. Future research will explore how frequently this occurs with reference to control groups. Importantly, we do not know about these individuals' offline behavior or their behavior in other online contexts. Assessments of empathizing have, to date, not explored the practice of empathy. Future research will compare expression of emotion and empathy between online and offline contexts. This will include the extent to which those with ASD practice empathy in both online and offline settings.

There is a wealth of research to suggest that people who only communicate through online environments can have strong social bonds; for example, between those in online relationships who never actually meet (Whitty & Gavin, 2001). Thus, having strong bonds within online environments is not specific to ASD. The extent to which effective communication within online contexts supports strong social bonds and bonding social capital in those with ASD in online and offline contexts is a fascinating question for future research. There seems initial support for the hypothesis that the deficits identified in the offline word in empathizing in ASD are not present in the online world (i.e., Facebook-based communication). Within the studies described above, the social-emotional communication and interaction within an online context have been comparable for those with and without ASD – that is, "normal."

What is "Normal"?

This raises an interesting question as to whether the affect-limited nature of online communication makes those without ASD communicate in a more ASD-like manner. Again, this is where comparisons between online and offline behavior for future
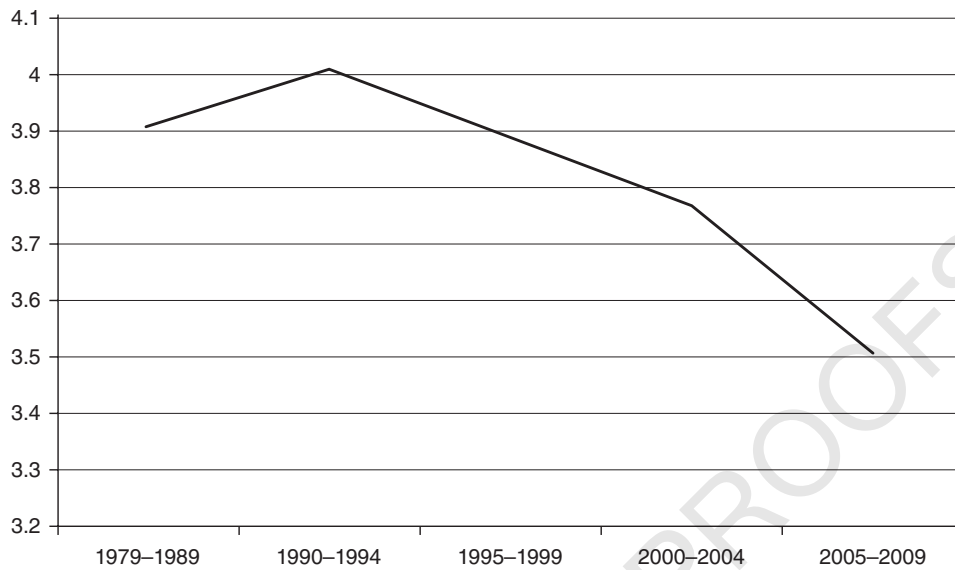
Figure 14.5 College students self-reported empathy from 1979 to 2009.

research will be invaluable. There has also been a suggestion that the preponderance of online communication is reducing empathy within the general population. Konrath, O'Brien, and Hsing (2011) conducted a meta-analysis of the self-reported empathy levels of 13,737 American students over a 30-year period from 1979 to 2009. Figure 14.5 highlights a general trend of declining empathy levels from 1990 to the present day. One of the authors, Ed O'Brien, argued that "It's harder for today's college student to empathize with others because so much of their social lives is done through a computer and not through real life interaction" (Nicholson, 2010). This causality needs to be confirmed; however, it does raise an interesting question as to what is the "normal" level of empathizing, and how consistent is this over time. It's a fascinating possibility that the dominance of online communication could bring about comparable empathizing skills in those with and without autism. However, this is far from being established and any causal relationship between autism and Internet use has been the focus of heated academic debate (see McVeigh, 2011).

What is ASD? Revisited

To return to the first question of this chapter, the DSM-5 criteria suggest that for a diagnosis of ASD, the social communication and interaction deficits should persist across all contexts (and not accounted for by general developmental delay). For a diagnosis, the following criteria must be met: *Problems reciprocating social or emotional interaction, including difficulty establishing or maintaining back-and-forth conversations and interactions, inability to initiate an interaction, and problems with shared attention or sharing of emotions and interests with others.*

Our studies above are provisional; however, in the online context, some of those with ASD do not fully meet these criteria. This could either challenge whether a

diagnosis of ASD is appropriate if one has effective social communication interaction online, or lead to the perplexing outcome of people having ASD offline but not online. Alternatively, the online context could be rejected as a social context; however, much of the literature above would make this position hard to justify. We must bear in mind the "caseness" of those with ASD discussed above (i.e., people who self-identify as ASD; we were unable to confirm a clinical diagnosis), but the potential that ASD does not exist online in some individuals who have a diagnosis offline has interesting implications. The affect-limited, time-delayed nature of online communication may ameliorate the deficits in empathizing (offline), allowing for those with ASD to "engage in the practice of empathy" (online). The emotional support indicative of bonding social capital is evident in online contexts, which may contribute to making the "cybercountry perfect" (Singer, 1999, p. 65) for those with "offline ASD." How to generalize the benefits of the online context to the offline world is a paramount question for future research. It is also interesting to note the high proportion of females with ASD who are using social media, when ASD is typically diagnosed more commonly in males (APA, 2013). Finally, the chapter started with a Facebook post from someone with ASD and it seems appropriate to finish in the same way:

> … thanks to facebook I have known parts of the human being I had never experienced before, I've fallen in love and I've seen the world with different eyes, both the real and the virtual one! So encourage your ASD friends to use facebook, because it can really, really help A LOT.

Acknowledgments

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