

Facebook profiles and their effect on real/ideal self-discrepancy: An investigatory study

Sabrina Lane

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Supervisor: Dr. Ciarán McMahon

Head of Department: Dr. S. Eccles

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Department of Psychology

DBS School of Arts

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Abstract

Social networking sites enable a form of strategic self-presentation that is rooted in an ethos of self-promotion. The purpose of the present study was to investigate if viewing one's own Facebook profile reduces discrepancy between real and ideal self-concept, and if viewing the Facebook profile of others increases this discrepancy. A secondary aim of this study was to investigate the type of social comparison that takes place on Facebook. In the current study 59 participants joined in an online experiment in order to investigate the above. The results show that viewing one's own profile does not significantly effect real/ideal self discrepancy. Viewing the profile of others does not result in increased unfavourable social comparison. Implications and potential future directions for research are discussed.

Introduction

“I can safely say that nearly every time I come off Facebook I feel like I should be re-evaluating some aspect of my life” (Duggan, 2011). This response was articulated by a journalism student after being presented with a recent study which showed that people have a tendency to overestimate the happiness in other people’s lives and underestimate negative instances in the lives of others thereby leaving individuals less satisfied with their own situation (Jordan et al., 2011). Although this research was not explicitly related to Facebook, the author of this paper did relate the study to the use of social networking sites and commented “...I do think there’s a potential hazard when people log online at times they’re already feeling sad, if they don’t recognise that the portrait of peer’s lives they’re receiving online can be as heavily edited as a television programme” (Jordan, cited in Duggan, 2011).

Furthermore it seems that there is growing concern about the potential for creating dissatisfaction through social networking sites such as Facebook. The American Academy of Pediatrics released a report in 2011 entitled “Clinical report – The Impact of Social Media on Children, Adolescents and Families”. The academy, in the introduction of this report, lists some potential dangers of social networking sites including cyberbullying, exposure to inappropriate material and “Facebook depression”. The report goes on to describe Facebook depression as “depression that develops when preteens and teens spend a great deal of time on social media sites, such as Facebook, and then begin to exhibit classic symptoms of depression” (The American Academy of Pediatrics, 2011, p. 802).

Facebook, one of the most popular and widely used social networking sites, is described as “a social utility that helps people communicate more efficiently with their

friends, family and coworkers” (Facebook, 2012). The social networking site was founded in 2004, and since then has grown to accumulate more than 18 million users, over half of whom log on to the site on a daily basis (Facebook, 2012). However people not only use Facebook to communicate with others, they also use it as a means of strategic self-presentation, engaging in impression management to convey themselves in the most socially desirable way realistically possible.

The purpose of this study is twofold; to investigate if self-presentation on Facebook allows the user to reduce discrepancy between real and ideal self and to investigate if viewing the strategically constructed profiles of others leads to a process of social comparison and increases real/ideal self-discrepancy.

Self-Presentation on Facebook

Facebook allows for a different style of self-presentation that is afforded by everyday life. People have complete control over how their profile is displayed; they can post a profile picture of their choice, upload photos of their selection, they can provide information about themselves, and update their status as they so choose. Although research from Gosling, Gaddis and Vazire (2007) shows that people do engage in self enhancement on their Facebook profile, research from Back et al. (2010) reports that Facebook profiles are synonymous with actual personality and that people do not construct an idealised virtual identity. However, given the features that enable impression management on Facebook, there can be no doubt that self-presentation on social networking sites such as Facebook is not constrained in the same way as self-presentation in face to face settings. Zhao, Grasmuck and Martin (2008, p.1818) refer to the Facebook environment as a “nonymous” environment; as a lot of the relationships on sites such as Facebook are anchored in real life settings, the user has to ensure a certain level of correspondence between their online identity and their real life identity.

Therefore on sites such as Facebook, people tend to express their hoped-for possible selves, i.e. an identity that differs both from their real-life identity and the ideal self.

Zhao et al (2008) found that the majority of Facebook users make implicit identity claims, by trying to create the desired impression on viewers through photos of the user in various social situations and by sharing their cultural interests and hobbies rather than making explicit descriptive statements. Evident throughout their study the researchers found an overall attempt by users to display themselves in the most socially desirable way possible, as both popular and well-rounded with a number of different hobbies and interests listed by users. The researchers concluded that the nonymous environment of Facebook served as a means by which users construct socially desirable identities that in real life they have not been able to establish.

Research from Krämer and Winter (2008) found support for the practice of impression management through social networking sites, in this case StudiVz. In their research they found that self-efficacy was strongly related to more elaborate self-presentation. Research from Mehdizadeh (2010) also found that people do engage in impression management on social networking sites, in this case Facebook. In this research it was found that individuals displaying trait narcissism and low self-esteem were associated with higher levels of online activity and also increased levels of self-promotional content. The results of this particular study demonstrated that individuals low in self-esteem tended to exhibit self-promotional behaviour in relation to the Main Photo section of Facebook

Research from Lampe, Ellison and Steinfield (2006) showed that participants believed that their profile represented them both accurately and positively, and they expected that their profiles would be searched for and view by peers. The researchers proposed that participants constructed their profile specifically with the “audience” of

peers in mind. It is evident from the above research that social networking sites such as Facebook enable a unique outlet for the expression of an idealised type of identity. Although users are somewhat constrained as many relationships on Facebook are based on real-life settings there is still a role for impression management, in that people can choose what they want to show and what they want to hide. This possibility alone allows for the individual to build an online identity based only on what they consider to be the more desirable aspects of themselves.

Although a lot of previous research has focused on the extent to which people who use social networking sites engage in impression management, there has been little research to date regarding the causes or outcomes of this behaviour. For example, are people engaging in this behaviour to impress others, or are they ultimately making themselves feel better? Does the creation of a “hoped for possible self” create an unattainable ideal that is impossible to live up to and ultimately demoralising? Or in other words does impression management on Facebook have any implications for user’s self-esteem?

Research from Haferkamp and Kramer (2011) shows that viewing the profile of attractive others on Facebook can result in increased real/ideal discrepancy in body build for females and career status for males, and in turn the creation of more negative feelings. However it is possible that through the construction of an online profile on sites such as Facebook the user can begin to reconcile their real selves with their best hoped for possible selves.

Real/Ideal Discrepancy

Central to the current study is an understanding of the self and self-concept. Rogers (1951) developed his theory of personality, and subsequently his model of client centred therapy, on an understanding of the self-concept and how it develops. Rogers

(1951) explained that when a child becomes aware that s/he has some control over some aspect within their environment they become aware of a concept of self. “The self structure is an organised configuration of perceptions of the self which are admissible to awareness” (Rogers, 1951, p. 501). Rogers goes on to explain that one’s self concept is composed of their perceptions of their abilities and personality characteristics, and their perceptions of themselves in relation to other people and their surrounding environment.

Rogers (1951) extended this theory by explaining that there are several types of experiences by the individual in relation to their concept of self. Experiences that occur within an individual’s environment are dealt with in one of three ways, they are either ignored because they are irrelevant to the individual’s self-concept, they may be symbolised and incorporated into one’s self concept, or in a third scenario experiences may be denied symbolisation by the individual or symbolised in a distorted way because the experience is considered to be inconsistent with the person’s self concept “...the fluid but consistent organisation which is the structure or concept of self, does not permit the intrusion of a perception at variance with it” (Rogers, 1951, p. 505). Behaviours, experiences and organic needs that occur but are at odds with the individual’s self-concept will result in tension and will cause anxiety for the individual.

Rogers viewed the self not as an independent agency, but as the sum of the individual in all its capabilities; the whole individual who is responsible for all of their thoughts and actions. However Rogers did differentiate between one’s self concept and one’s ideal self concept, which is a potential version of the self – the type of person one could in the future become. The ideal self refers to the individual’s hopes, aspirations and goals for the future.

Rogers (1951, p.141) also proposed that incompatibility between how one perceives their real self and their ideal self is at the root of anxiety in the individual. He

stated that during the commencement of therapy the client "...has an ideal of himself, but sees this ideal as very different from his present self". This discrepancy between the real and ideal self is associated with the individual feeling worthless, being very critical of themselves, and largely living by standards which others have set for them. The goal of Roger's client centred therapy is to reduce the discrepancy between the clients real self and ideal self, allowing the client to become more accepting of the person they actually are, to be more realistic in their perceptions and also allowing their vision of their ideal self to become more realistic and so closer to their perception of their real self. "He slowly discovers that what he wishes to be has shifted to a point where it is a more achievable goal, and that actually he is himself changed to a degree which brings him more in accord with his ideal" (Rogers, 1951, p. 142).

Many theorists both before and after Rogers focused on the notion of self-concept, for example Adler (cited in Pervin and Cervone, 2010) focused on how feelings about the self can orientate future behaviour, for example by over compensating for perceived inferiorities. Maslow incorporated self-concept into his theory of needs at the highest level of human needs; self actualisation. Maslow believed that the ultimate aim of all human beings was to live out their goals and expectations for themselves and become the kind of person they believe they really are and are always aspiring to be (cited in Pervin and Cervone, 2010).

Theory around the self-concept and discrepancy of self-concept was further explored by Higgins (1985; 1987). Higgins agreed that self-concept discrepancy causes negative affect, however Higgins expanded on this initial hypothesis by proposing his self-discrepancy theory. Higgins (1985) self-discrepancy theory distinguished between different psychological domains from which the self can be considered. Higgins differentiated between a total of six different types of self-concepts; he proposed that

there are three different categories of self concept; the actual self, which is an individual's representations of either their own beliefs of the type of person they actually are, or their beliefs about the type of person other people think they actually are. The ideal self, is composed of the individual's own beliefs about the type of person they would ideally like to be, or the individual's beliefs about the type of person they believe others would ideally like them to be. The domain of the ought self encompasses duties and obligations, it relates to an individual's own beliefs about the type of person they believe they should be and also the individual's beliefs about the type of person they believe other people think they should be.

As demonstrated, Higgins (1985) not only differentiated between the different domains of the self but also between different standpoints from which one can consider oneself. There is the individual's own standpoint, what they think about themselves, and there is the standpoint of others, namely a significant other be it mother, brother or friend. In total Higgins proposed that there are six different self-state representations, which arise from combining the three self-concepts (ideal, actual and ought) and the different standpoints on the self (one's own and that of a significant other).

Higgins also theorised that discrepancies between the various self-state representations are related to different kinds of emotional discomfort and vulnerabilities. "Unquestionably, people's conceptions of their actual-self attributes (current or future) or people's self-concepts are a major source of emotional-motivational problems" (Higgins, 1989, p. 94). For example, discrepancy between actual self and ought self, encompassing here one's own beliefs and the beliefs of a significant other, are associated with the presence of agitation related emotions. From the individual's own point of view if they believe that they have failed to live up to acceptable standards then they will feel a variety of agitated emotions, such as self-

contempt, guilt and uneasiness. If the discrepancy lies between one's own beliefs about their actual self, and their beliefs about the type of person other's think they ought to be then the individual will feel agitation related emotions such as fear and feeling threatened. These emotions are experienced due to the individual feeling that they have not lived up to their duties or obligations therefore are in a state of agitation due to (theoretically) possible punishment for their supposed failures.

Discrepancy between actual and ideal self-states are associated with a different range of emotions than those associated with discrepancy between actual and ought self-states. Higgins found that discrepancy between people's own perceptions of their actual and ideal self is associated with the absence of positive outcomes, specifically dejection related emotions. People may feel dejected, miserable and disappointed in themselves because their accomplishments in life have failed to live up to their goals and expectations.

Own actual/ideal discrepancy in particular has also proven to be predictive of low self-esteem (Higgins, 1987) and so for the purpose of this study there will be a focus on own actual/ideal self-discrepancy as opposed to taking into consideration the standpoint of significant others and ought to self-representations.

Self-Esteem and Facebook

Research has indicated that there is a negative relationship between self-esteem and the amount of time spent on Facebook (Mehdizadeh, 2010; Kalpidou, Costin and Morris, 2011) suggesting that there is some motivation from people with low self-esteem to engage with the site on a regular basis. Research from Steinfield, Ellison and Lampe (2008) suggests that people with low self-esteem gain more from their use of Facebook in terms of bridging social capital than those with high self-esteem. However

the acquisition of social capital does not seem to fully explain the specific attraction to Facebook for those with low self-esteem.

Gonzales and Hancock (2011) carried out a study in order to investigate the relationship between self-esteem and Facebook usage with focus on the effect that selective self-presentation can have on self-esteem levels. In this study a total of 63 participants, a sample consisting of 16 male students and 47 female students, were assigned to one of three categories; exposure to a mirror, exposure to one's own Facebook profile, and a control condition without any internet exposure. After three minutes exposure to the mirror and Facebook condition, and straight away in the control condition, participants were asked to fill out the Rosenberg Self-Esteem scale. The results showed that participants who viewed their own profile reported having higher self-esteem than participants who viewed their own profile and the profile of others. Furthermore participants who viewed and edited their own profile reported higher self-esteem than those who had viewed their own profile but did not edit it.

The researchers suggest that the reported increases in self-esteem after viewing and editing one's own profile could be as a result of the participants advancing in consistency between real and ideal self via the means of strategic self-presentation and profile construction on Facebook, however this was not within the remit of this particular piece of research.

There are several limitations of this study that must be taking into consideration. Firstly, the particular sample used for this study consisted of far more female participants than male. Furthermore there was not the same time lapse between activity and filling out the self-esteem scale in each condition. In both the mirror condition and the Facebook condition each group had three minutes within the room before they had to fill out the questionnaire. Whereas in the offline condition there was no filler task

assigned to the control condition, in which participants were presented with the Rosenberg Self-Esteem Scale immediately without any time lapse.

However notwithstanding the above mentioned limitations this study does have important implications for future research regarding the effect of online self-presentation on self-evaluation and also on how we evaluate others in an online environment.

Based on the above mentioned research findings the research question is as follows:

Is it possible that the strategic self-presentation afforded by Facebook activates the ideal self, allowing users to bridge the gap between real and ideal self, thereby leading to increases in self-esteem?

Further investigation is also needed in order to determine why looking at the profile of others along with one's own profile did not result in similar gains in self-esteem when compared to only viewing one's own profile.

The Current Study

As proposed by Leon Festinger's (1954) social comparison theory, human beings have an innate drive to evaluate their opinions and abilities, and that in the absence of objective means in the physical world against which people can evaluate themselves then they will do so in comparison with others. To date there have been few comprehensive studies carried out on social comparison on Facebook. During one particular piece of research participants were presented with fictitious profiles (i.e. profiles not in the participant's own group of friends) of either extremely attractive individuals, or unattractive individuals. The results showed that female participants who viewed the attractive user profiles reported a more negative body image than

participants who had viewed the unattractive profiles. Male participants were presented with the profile of either extremely successful males, or less successful males. The male participants of this study cited greater discrepancy between their current career status and their ideal career status after viewing the profile of the successful males (Haferkamp and Kramer, 2011). This research indicates that people do indeed engage in social comparison when they are on Facebook. It also shows that in the context of profile pictures and career information on Facebook upward social comparison leads to increased self-discrepancy at least in relation to body build and career status.

However it is important to note that in the study carried out by Haferkamp and Kramer (2011) the research participants were presented with fictitious profiles, therefore the baseline of comparison presented participants with perhaps an unattainable ideal. It is possible that social comparison that takes place on Facebook with a more realistic baseline of comparative others, one's own Facebook friends, will not yield similar results in greater real/ideal self-discrepancy. Nonetheless, based on findings from Gonzales and Hancock (2011), one must question whether viewing the profiles of others does not lead to the same increases in self-esteem associated with viewing one's own profile due to social comparison processes.

Research from Chou and Edge (2012) was carried out in order to investigate the impact of Facebook usage on people's perceptions on other people's lives. The researchers carried out this study on a sample of 425 undergraduate students and included measures such as the number of years using Facebook, time spent on Facebook each week, number of Facebook friends, and their perceptions about the lives of others was also measured using a questionnaire developed by the researchers. The results found that participants who had been using Facebook the longest tended to believe that other's had better lives than themselves. This result was compounded by the number of

friends the participants had and the types of relationships participants had with their Facebook friends; the more friends that a participant had that they did not personally know the more they tended to believe that others had better lives than themselves.

The researchers proposed that correspondence bias, the belief that the positive content presented on the Facebook profiles of others was based on personality factors rather than situational factors, along with the availability heuristic, easily recalled examples of positive content, leads Facebook users to feel that life is not fair, and that others are generally happier than themselves. Based on this research one can assume that Facebook users are actively comparing themselves with their friends on the site, and the baseline of comparison is often not the most realistic due to the availability of strategic self-presentation methods that are available on online social networking site such as Facebook.

The purpose of this study is to investigate these questions. The research to date has shown that viewing and editing one's own Facebook profile as opposed to viewing the profile of others on Facebook is associated with increases in self-esteem (Gonzales and Hancock, 2011). Furthermore, recent research also indicates that upward social comparison that takes place on Facebook leads to increases in real/ideal discrepancy of body build for females, and discrepancy in real/ideal career status for males (Haferkamp and Kramer, 2011). Based on these findings the hypotheses of the current study are as follows:

H1: It is hypothesised that participants in the "view own profile" condition will show a significantly reduced discrepancy between real/ideal self

H2: Participants in the "view only the profile of others" condition will report increased real/ideal self-discrepancy

H3: Participants in the “view only the profile of others” condition will engage in significantly more unfavourable social comparison than participants who view their own profile only and in the control condition

Each of these predictions is presented in the following study, which compares the effect of viewing one’s own profile on Facebook, viewing the profile of others and being in a control reading condition on self-reported real ideal self-discrepancy and on social comparison.

Methodology

Materials

A demographic questionnaire was designed by the researcher in order to obtain information about the participants such as age, gender, and if they had a Facebook account. In addition to this participants were asked to complete a series of questionnaires including the Selves Questionnaire (Higgins, 1985), and the Social Comparison Scale (Allen and Glibert, 1995).

The Selves Questionnaire.

The Selves Questionnaire (Appendix A) is a self-report measure that was developed by Higgins in 1985, and was developed to measure self-concept discrepancy. The Selves questionnaire asks that participants list up to 10 attributes associated with each of six different self-concepts. Each distinct self concept is comprised of a particular domain of the self (actual, ideal and ought) and different standpoints from which the self can be considered; i.e. one's own standpoint, or what one believes to be the standpoint of a significant other. This model has been used to investigate the different emotional states that are associated with various types of self-concept discrepancy (Higgins, 1985).

The Selves Questionnaire (Higgins, 1985) used in the current research was modified slightly by reducing the questionnaire in order to include only the domain of actual and ideal self-concept considered from one's own point of view. As the domain of the ought self along with the standpoint of significant others was considered to be irrelevant for the purpose of this research they were not measured.

A two stage process is used to score the Selves Questionnaire. The first step entails the comparison of the attributes in each self-concept, in the current research the

attributes of the actual self concept are compared with the attributes of the ideal self concept. The aim of this process is to determine which attributes match. The process is carried out again in order to determine which attributes mismatch. Matches and mismatches, or synonyms and antonyms, are operationally defined in terms of Roget's thesaurus. The self-concept discrepancy score is calculated by subtracting the total number of matches from the total number of mismatches, therefore the potential score ranges from -10 to +10. It follows that a minus figure indicates more matches between real and ideal self concept, and a positive figure indicates the presence of more mismatches between real and ideal self-concept.

The Selves Questionnaire was chosen to measure real/ideal self discrepancy even though it is quite a subjective measure. Research from Moretti and Higgins (1990) indicates that a nomothetic measure such as the Selves Questionnaire is a more accurate measure of self-discrepancy than an idiographic measure such as rating oneself on a standard set of personality characteristics. Attributes chosen by the participant are presumed to be more meaningful to them than a forced choice.

In order to test the reliability of the Selves Questionnaire in this instance, independent raters were asked to score the data from the Selves Questionnaire in order to investigate if the measure has interrater reliability. Of the 59 responses received, 25 randomly selected responses were presented to independent raters to score in order to determine if the questionnaire had interrater reliability. A Pearson's correlation was carried out on the rater's scores for the Selves Questionnaire before allocation to the condition and after completion of the condition and the researcher's scores of the same cases in order to investigate the correlation between the two sets of scores (see Appendix E). There was a significant relationship found between the rater's scores and the researcher's scores before the condition on the 25 cases ($r=0.947$, $df=23$, $p<0.001$).

There was also a significant relationship found between the independent rater's scores and the researchers scores of the Selves Questionnaire after the participants had completed the condition of either spending time on Facebook or reading an article from the National Geographic ($r=0.967$, $df=23$, $p<0.001$). Therefore the Selves Questionnaire can be considered as having interrater reliability.

The Social Comparison Scale.

The Social Comparison Scale (Appendix B) is a self-report measure, developed by Allen and Gilbert in 1995, which was designed to measure social comparison. The scale presents participants with 11 different construct pairs, for example inferior and superior. The participant is requested to rate themselves along this continuum by using a ten point scale. So for example if a person was to rate themselves with a score of 1 along the continuum from inferior to superior this would indicate that they see themselves as more inferior than others. The total Social Comparison Scale score is obtained by adding up the score from all of the items. Possible scores range from 11 to 110.

The Social Comparison Scale measures three distinct aspects of social comparison as revealed by factor analysis of the measure (Allen and Gilbert, 1995); social rank related comparison, social attractiveness comparison and social comparison of group fit. The scale has been found to have moderately high internal consistency with Cronbach's alpha ranging from .88 with clinical populations to .91 with student populations (Allan and Gilbert, 1995).

As this research was largely relevant to the online community, and users of social networking sites, this research was carried out online, and was designed using the Google Docs survey application. Participants needed internet access in order to participate.

Participants

Participants were a convenience sample recruited by the researcher through two methods. Part-time psychology students were informed about the study and submitted their email address if they were willing to partake in the research. An invitation to participate in the study was also posted on an online social forum www.boards.ie. The invitation was placed in the “Psychology” forum and people could click on the link to participate in the research directly from this forum. The sample was allowed to snowball as participants were informed that they could send the link on to friends or family who they thought might be interested in participating also. As participation in the research was voluntary there was no reward or incentive offered to take part.

Therefore the final sample consisted of members of the general population and psychology part-time undergraduate students. The final number of participants was 60, however one participant said they would not answer the questions honestly and accurately, a question on the first page of the survey, and so they were taken to the end of the survey directly without participating. The final number of participants that took part was a 59 which consisted of 36 females, 20 males and 3 participants who preferred not to disclose their gender.

The participants were randomly assigned to one of the following conditions; viewing one’s one Facebook profile for ten minutes, viewing the profile of one’s Facebook friends for ten minutes, or a control reading condition which involved reading an article on the website of the National Geographic (Appendix C) for ten minutes. The participants were assigned to these three conditions based on the final digit of their mobile telephone number. Participants were requested to enter the final digit of their telephone number. Participants whose telephone number ended in 0 – 3 were directed to condition one, viewing their own profile. Participants whose number ended in 4 – 6

were directed to condition two, viewing the profile of their Facebook friends, and participants whose phone number ended in 7 – 9 were directed to the control reading condition on the National Geographic website. Participants who did not have a Facebook account were also directed to the reading condition.

In total 26 participants were allocated to the “view own profile” condition, 16 participants were allocated to the “view the profile of others” condition and 18 participants were allocated to the control reading condition.

Design

The current research took the form of an experiment; it was a mixed data collection including mostly quantitative methods with a minor qualitative data collection aspect also. Participants were assigned to one of three groups based on the last digit of their telephone number; whether it was 0-3, 4-6, 7-9. The three conditions consisted of either looking solely at your own profile on Facebook, looking solely at the profile of your friends on Facebook, or a control reading condition in which the participant was directed to a piece of writing on the National Geographic website. The independent variable of this experiment was Facebook usage, and the dependent variables includes participant’s concepts of their ideal self and social comparison.

In relation to the qualitative data collected at the end of the questionnaires, this data was analysed by coding each statement as either a positive statement, a negative statement, a mixed statement, containing both positive and negative elements and a neutral statement, which stated no particular negative or positive opinions or feelings.

The dependent variable of ideal self was both a between groups and a within groups measure. Participants in all three groups were asked to list ten attributes of their ideal self both before completion of the task of viewing Facebook or the online reading

task, and after they had completed these tasks also. The dependent variable of social comparison was a between groups measure only.

Procedure

This research was carried out online, with the questionnaires posed using Google Docs survey feature. The first page explained the purpose of the study (Appendix D). Participants were informed that participation in the research was voluntary, confidential and anonymous and that they had the right to withdraw at any time during the process of participating. However, participants were informed that as responses could not be attributed to any one person that it would not be possible to withdraw after they had completed and submitted their responses. Contact details were provided for the researcher and supervisor of the research, and finally participants were asked if they would answer the questions honestly and accurately before they could proceed with their participation. If they answered this question in the negative then they were taken to the last page of the survey in order to exit.

Participants were first requested to list ten attributes of their actual self, the person they consider themselves to be. There were ten spaces available into which people could insert adjectives of their choice. On the next page participants were then asked to list ten characteristics of their ideal self, the type of person they would ideally like to be. After this participants were asked if they had a Facebook account. If not they were directed to the control reading condition. Participants were directed to a specific article which was on the National Geographic website. The article pertained to the domestication of wild animals and was deemed suitable in length for reading for ten minutes, and also as an article that would not cause readers to be self-reflective.

If participants did have a Facebook account they were allocated to one of three conditions depending on the last digit of their mobile phone number. Based on which

group they were allocated to participants were requested to spend ten minutes looking solely at their own profile, 10 minutes looking solely at the profile of their Facebook friends or ten minutes reading the article on the National Geographic website.

After participants had completed this task they were then requested to list again ten characteristics of their ideal self, the type of person they would ideally like to be. Participants were then requested to fill out the Social Comparison Scale, however instructions were modified slightly to read “in comparison to my Facebook friends” instead of “in comparison to my friends”. As some participants may not have had a Facebook account there was a note added into these instructions to ask participants to compare themselves to their friends in general if they did not possess a Facebook account.

Finally the participants were asked to answer one qualitative question if they so chose. This question was “How do you feel after spending time on Facebook?” Participants were then directed to the final debriefing page. Contact details for the researcher and the supervisor of the research was included in the introductory page and the final page.

Participants were not required to submit any personally identifying information; therefore it can be expected that as answers could not be attributed to any one participant that responses are more likely to be honest. Statistical analysis of the data was carried out using PASW Statistics 18.

Results

A total of 59 participants completed the experiment. Participants consisted of 20 males, 36 females and 3 participants who chose not to disclose their gender. The age of participants ranged from 18 to 51, the mean age of participants was 30.78. The mean score on the Selves Questionnaire before completion of the condition was -1.12 (SD 2.49), and the mean score on the Selves Questionnaire after completion of the condition was -1.39 (SD 2.19). The mean score on Social Comparison Scale was 57.61 (SD 13.43).

A one way unrelated analysis of variance (ANOVA) was carried out (Appendix F) in order to investigate hypothesis one, which stated that participants in the view own profile condition would show a significantly reduced discrepancy between real/ideal self as opposed to the participants in the view the profile of others condition or the control reading condition. The mean score on the Selves Questionnaire for those in the view own profile condition was -1.96 (SD 2.48), which was slightly higher than the mean score for those in the view only the profile of others condition, which was 1.06 (SD 1.34). The mean score on the Selves Questionnaire for participants in the control reading condition was -0.89 (SD 2.3). These results indicate that those who viewed their own profile showed the greatest number of “matches” between their real self and ideal self. However, the results of the ANOVA showed that viewing one’s own Facebook profile has no statistical significant effect on actual/ideal self-discrepancy, ($F_{2,56}=1.53, p=0.227$).

Cases were split by gender, two ANOVAs were carried out in order to investigate if there were there were any significant differences in real/ideal discrepancy after viewing own Facebook profile for males and females. The results showed that females did show increased number of matches between real and ideal self after viewing

their own profile with a mean score on the Selves Questionnaire of -1.21 (SD 2.59), compared to -0.90 (SD 1.37) after viewing the profile of others and -.43 (SD 1.90) after the control reading condition. However the results are not deemed to be statistically significant ($F_{2,33}=2.19$, $p=0.128$). It was also found that for males viewing one's own Facebook profile did not have a significant effect on real/ideal self discrepancy ($F_{2,17}=.140$, $p=-0.870$).

In relation to hypothesis three, a one way unrelated analysis of variance was carried out in order to investigate if participants in the "view only the profile of others" condition engaged in significantly more unfavourable social comparison than participants who viewed their own profile or participants in the reading control condition (Appendix F). The mean score on the Social Comparison Rating Scale for those in the view the profile of others condition was 55.88 (SD 13.17), however the mean score on the Social Comparison Scale for those who viewed their own profile was 60.36 (SD 13.63) indicating that those who viewed their own profile tended to rate themselves more favourably in comparison to others. The mean score on the Social Comparison Scale for those in the control reading condition was 55.33 (SD 13.46). However, the results of the ANOVA showed that viewing the Facebook profile of others as opposed to one's own Facebook profile or participating in a reading control condition has no significant effect on Social Comparison Rating scores, ($F_{2,56}=0.913$, $p=0.407$).

Previous factor analysis of the Social Comparison Rating Scale indicated that this scale measures three distinct aspects of social comparison: social comparison of rank, social comparison of group fit and social comparison of attractiveness (Allen and Gilbert, 1995). In order to investigate if viewing one's profile or the profile of others has a significant effect on any of these three domains these items were considered

separately and a one way analysis of variance was carried out in order to investigate these three domains separately (Appendix G). Table 1 indicates the mean for each group on social comparison of rank, social comparison of group fit and social comparison of attractiveness.

Table 1: Mean Score Across Groups

	Condition	N	Mean	SD
<i>Social Comparison of Rank</i>	<i>Own FB</i>	25	28.20	6.32
	<i>FB Friends</i>	16	28.31	6.11
	<i>Reading</i>	18	25.00	6.83
<i>Social Comparison of Group Fit</i>	<i>Own FB</i>	25	15.76	4.88
	<i>FB Friends</i>	16	13.38	4.69
	<i>Reading</i>	18	15.33	4.04
<i>Social Comparison of Attractiveness</i>	<i>Own FB</i>	25	16.12	4.97
	<i>FB Friends</i>	16	14.19	5.18
	<i>Reading</i>	18	15.00	5.29

*FB indicates Facebook

As Table 1 illustrates the mean score for participants who view their own profile was highest in terms of social comparison of group fit and social comparison of attractiveness when compared with those who viewed the profile of their Facebook friends and in the reading control condition. However, it was found that viewing the profile of one's Facebook friends does not have a significant effect on one's perception of social comparison of group fit ($F_{2,56}=1.394$, $p=0.256$) or on one's perception of social comparison of attractiveness ($F_{2,56}=0.726$, $p=0.488$). It was also found that viewing the profile of others as opposed to one's own profile or a control reading

condition does not have a significant effect on perception of social comparison of social rank ($F_{2,56}=1.597, p=0.212$).

As participants were requested to fill in the ideal section of the Selves Questionnaire twice, before completion of the condition and after, a paired samples t-test was carried out in order to investigate the relationship between the two sets of scores from before and after participants had been allocated to any particular condition (Appendix H). The mean score on the Selves Questionnaire before completion of the condition ($M=-1.12, SD=2.49$) and after completion of the condition ($M=-1.39, SD=2.19$) did not differ significantly ($t=1.605, df=58, two-tailed p = 0.114$).

Qualitative Data

At the end of the online survey, participants were presented with an opened ended question: How do you feel after spending time on Facebook? Of the 59 participants who completed the survey, 54 answered this question, which had been presented as an optional question to participants.

The 54 responses were rated as either being positive; a fully positive statement, negative; a fully negative answer, mixed if the answer contained both positive and negative aspects or neutral if the participant reported no major differences.

From the 54 responses to the open ended question only 10 participants answered that they felt more positive after logging off from a session on Facebook. All of the positive answers, with the exception of one participant who reported feeling relaxed, included some element of connectedness, either by sharing pictures, receiving updates from friends or simply knowing what their friends were doing. "I feel like I am more connected with my friends, that I am more 'in the know' when I check my page, I feel happy when I have a lot of comments or messages".

A total of 11 participants provided mixed answers, i.e. answers containing both a positive and a negative statement to describe their feelings after logging off Facebook. Out of the 11 mixed responses 5 participants referred to some sense of loneliness or sensation of being left out of events they afterwards see publicised on Facebook. “Sometimes I feel happy, sometimes sad as you see your friends doing things that you were not aware of i.e. a party”. The remaining four participants had miscellaneous reasons for feeling both positive and negative about their experience on Facebook, however 2 participants did refer to a feeling of having wasted time.

15 participants in total reported feeling no different after they had used Facebook. Out of this 15 participants 4 reported feeling no different as they did not interact very much with the site, by either not spending a lot of time on it or not taking action when they are on the site, for example by leaving comments. The remaining participants indicated that they feel no particular differences after spending time on Facebook.

The majority of the 54 participants who answered this question, 18 participants in total, reported feeling more negatively after having used the site. Out of the 18 participants who answered this question in the negative, 6 of them mentioned or indicated that in some way when they were using Facebook they were comparing themselves to others and left feeling unsatisfied as a result. For example participants mention feeling jealousy that others are achieving more than they are, are having more fun and interesting events in their lives. Of the other participants who answered this question in the negative 4 refer to feeling left out; one participant reported feeling “Kinda depressed really, lots of stuff going on that I’m not part of any more , like parties and career..” while another participant said they felt “Left out, wish I had a more exciting life”. Out of the remaining participants who reported feeling more negative

after using Facebook several miscellaneous answers were given, including general feelings of being unsatisfied or having wasted time.

To summarise, 54 participants answered the question “How to you feel after logging off Facebook”. Out of these 54 participants 18 reported negative feelings after using Facebook, the majority of which were related to comparison with others on the site or feeling left out, 15 participants reported feeling no differently as a result of using the site, 11 participants reported mixed feelings, often containing both positive and negative statements and 10 participants reported positive feelings after having spent some time on Facebook.

Discussion

The aim of this study was to investigate if viewing one's own Facebook profile leads to a decrease in real/ideal self discrepancy. A further aim of this research was to investigate if viewing the Facebook profile of others would lead to an increase in real/ideal self discrepancy and finally to investigate if viewing the Facebook profile of others would lead to an increase in unfavourable social comparison as opposed to viewing one's own profile or being placed in a reading control condition.

The results show that viewing one's own Facebook profile does not significantly affect real/ideal self discrepancy. There was no significant difference found in real/ideal self discrepancy among participants who viewed their own profile, participants who viewed the profile of others, or participants who were placed in an online reading control condition. Therefore, although previous research has shown that strategic self-presentation on Facebook leads to increases in self-esteem (Gonzales and Hancock, 2011) this style of identity construction on Facebook does not significantly affect real/ideal self-concept discrepancy.

Furthermore the results do not support the hypothesis that viewing the Facebook profile of others would lead to an increase in real/ideal self discrepancy. There was no significant difference found in real/ideal self-discrepancy among participants who viewed their own profile, participants who viewed the Facebook profile of others, or participants who were placed in an online reading control condition.

Results also did not support the hypothesis that viewing the profile of others would lead to increased unfavourable social comparison. The results showed that there was no significant difference found in social comparison among participants who viewed their own profile, participants who viewed the profile of others or participants who were allocated to the online reading control condition.

These results do not seem to be in keeping with previous research which found that viewing one's own profile leads to increases in self-esteem (Gonzales and Hancock, 2011), and research which demonstrated that long term Facebook usage was associated with the increased belief that other's lives are happier than one's own (Chou and Edge, 2012). However, in light of other research, there could be several reasons why the conclusions of this research were not supported, aside from limitations of the current research which is discussed below also.

Although research has found that viewing one's own profile increases self-esteem (Gonzales and Hancock, 2011) it may be possible that this increase in self-esteem is not due to the selective style of self-presentation allowed by social networking sites such as Facebook but by the social connectedness that it allows. Previous research on Facebook usage and bridging social capital, i.e. loose but essential social connections that allow people to see themselves as part of a larger group, indicated that Facebook allowed particularly students with lower levels of self-esteem to form social networks with more ease. The researchers proposed that the infrastructure of the site allowed for low self-esteem users to interact with others without the fear of rejection that may impede their social interaction on a face to face basis (Steinfeld, Ellison and Lampe, 2008). It is possible that regardless of whether one is viewing one's own profile or the profile of others Facebook users gain in self-esteem by the acknowledgement that they are an active part of a wider social group, which gives them a sense of belongingness.

Recent research has found that the greatest predictor of social networking site usage was the need for popularity. Beyond personality traits and self esteem, need for popularity was proven to be the most effective predictor of behaviours on social networking sites (Utz, Tanis, and Vermeulen, 2011). The researcher tentatively suggests that any advantages or disadvantages Facebook usage potentially offers to

real/ideal self discrepancy is overridden by the benefits users gain from feeling like they are part of a cohesive social network. However it must be noted that as this theory was not within the remit of the current research, this suggestion is merely explorative.

This would be somewhat supported by the results of the qualitative data which was incorporated into the research through the question “How do you feel after spending time on Facebook”. Of the participants who answered this question, which was 54 in total, 10 participants indicated that they viewed Facebook as a positive experience, and of this 10 people 9 of them indicated that the positive experience of Facebook was due to the sense of connectedness it provides.

However not all participants experienced Facebook as a positive experience. The majority of participants, 18 of them, answered the qualitative question indicating that they felt more negative after having spent time on the social networking site. Out of this group of answers, 4 of them were attributed to feeling left out after they had used the site. Of the 11 people who had mixed responses about their experience of using Facebook, i.e. responses including both a negative and a positive statement, almost half of these answers contained reference to a sense of loneliness or being left. It would seem that social connection is a critical aspect of the value which Facebook holds for many Facebook users, be that in a negative or a positive way.

As mentioned above, the current research also did not find support for the hypothesis that viewing the profile of others on Facebook leads to increases in unfavourable social comparison when compared to those who view their own profile. However previous research has found that long-term Facebook users tend to believe that life is not fair, and that others’ lives are happier than their own (Chou and Edge, 2012). This study would indicate that there is some social comparison taking place on social networking sites, as would be expected. This is further illustrated by research carried

out by Haferkamp and Kramer (2011) which found that viewing some fictitious attractive/successful Facebook profiles resulted in greater real/ideal discrepancy in body build for females and greater actual/ideal career discrepancy for male participants.

The qualitative data collected from the current research would also seem to support the thesis that social comparison does indeed take place on Facebook. For example one third of the people who reported negative feelings after using Facebook referred to feelings of dissatisfaction with their current status after comparing themselves with others on the site. However the data analysis of the current research does not support this thesis and a myriad of factors could have influenced the participants in their answers, including mood states and any recent negative experiences. It is worth bearing in mind research from Chou and Edge (2012) which indicated that people with more Facebook friends that they don't personally know tend to agree more that others have happier lives than themselves. There was no measure of Facebook friends included in the current research, nor was there any measure to capture how well participants knew their Facebook friends.

It seems level of intimacy with Facebook friends is a key determinant in the kind of social comparison that does take place, however again this is merely an ad-hoc explorative suggestion. In consideration of the research from Haferkamp and Kramer (2011) the participants were presented with fictitious profiles of very attractive people or very successful people, whom the participants did not personally know. The participants in the current study who were allocated to the view the profile of others condition did not look at fictitious profiles, but profiles of their own Facebook friends. Research has shown that Facebook profiles are reflective of real personalities and not an idealised version of the self (Back et al., 2010) as they are largely based on face-to-face settings and relationships in real life. Therefore, although Facebook does allow for

strategic self-presentation it is possible that the participants in the current study are familiar enough with their Facebook friends not to be fooled as it were by the positive images and expressions that they put forward in their Facebook profiles. It is possible that there was no significant effect on social comparison as participants see their Facebook friends as a realistic baseline of comparison and are therefore not so harsh on themselves when making comparisons with their Facebook friends.

Limitations

The central concern with the current research was the lack of laboratory controls over experimental conditions. Although each participant agreed to participate honestly and accurately, they were merely requested to view their own Facebook profile, view the Facebook profile of their friends, or read an article on the National Geographic website. There was no way for the researcher to verify if participants actually carried out these instructions. It would be recommended that this research, if it were to be replicated, would be carried out under strict laboratory conditions.

Secondary concerns include subjectivity in data analysis of both the Selves Questionnaire and the qualitative information that participants provided in relation to how they felt after spending time on Facebook. Subjectivity in the Selves Questionnaire was reduced by independent raters who also scored 25 of the participants responses to the Selves Questionnaire and these scores were correlated with the researcher's scores. However the classification of the qualitative data was not independently rated by outside persons. Therefore it would be highly recommended to avoid this potential bias by including several independent raters in any future similar research.

As a convenience sample was used for the current research it would not be suitable to generalise from the results of the current research to the entire population. It

is recommended in future to establish more rigid sampling procedures in order to avoid this limitation.

Another limitation of the current research was that participants were asked to spend only ten minutes in each condition. It is possible that self concepts such as concepts of the actual self and the ideal self are stable constructs that would not be affected by ten minutes in any particular condition. In consideration of recent research (Chou and Edge, 2012) it would seem that longitudinal studies may be more beneficial in order to investigate the consequences of Facebook usage, or indeed the impact of other social networking sites.

The current research did not include any measure of number of Facebook friends, nor did it question the kind of relationship participants had with their Facebook friends. As other recent research indicates that level of intimacy with Facebook friends at least effects some types of comparison it would be a worthwhile initiative to include elements within similar research that take number of friends and familiarity of relationship into consideration.

Recommendations

Aside from the improvement of research design, by carrying out the research under strict laboratory controls, including several independent raters for both the Selves Questionnaire and the classification of the qualitative data, and stringent sampling procedures, the inclusion of measures that encompass the number of Facebook friends and the quality of these relationships in real life is highly recommended.

The current research indicates that Facebook usage does not impact on real/ideal self discrepancy or social comparison. However the qualitative data somewhat disagrees with this and adds weight to the theory that some social comparison does take

place on Facebook, however social connectedness, and familiarity of relationships with Facebook friends could potentially play a part in this.

It is recommended that future studies should investigate, on a longitudinal basis, the consequences of various types of relationships that are maintained on Facebook for the individual Facebook user for their self-esteem and how they view their own standard of living. This type of research could be beneficial in identifying the type of Facebook connections which are potentially helpful to the individual but also the type of connections that could be quite destructive to their emotional wellbeing.

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Appendix A

Selves Questionnaire

In the following questionnaire you will be asked to list the attributes of the type of person you believe you actually are, and the type of person you ideally would like to be.

Actual self refers to your beliefs concerning the attributes you think you actually possess.

Ideal self refers to your beliefs concerning the attributes you would like to ideally possess; the type of person you would ideally like to be.

There are two sections to this questionnaire, section one will ask you to consider the type of person you believe you actually are. You will be asked to describe the person you actually you are by listing 10 traits/adjectives that describe you best.

The second section of this questionnaire will ask you to consider the type of person you ideally would like to be. You will be asked to describe the person you ideally would like to be by listing 10 traits/attribute that describe your ideal self best.

Traits/attributes listed will be freely chosen by you. Repetition of traits/attributes in section one and two is acceptable if you feel this is appropriate, overall it is important to describe your actual self and ideal self as you believe them to be as accurately as possible.

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Selves Questionnaire

* Required

Section 1: Actual Self

Please take a few moments now to think about the type of person you actually are. List ten traits or attributes you believe you actually possess.

Actual Self 1 *

Actual Self 2 *

Actual Self 3 *

Actual Self 4 *

Actual Self 5 *

Actual Self 6 *

Actual Self 7 *

Actual Self 8 *

Actual Self 9 *

Actual Self 10 *

Ideal Self

Please take a few moments now to think about the type of person you would ideally like to be. List ten traits/attributes you would ideally like to possess.

Ideal Self 1 *

Ideal Self 2 *

Ideal Self 3 *

Ideal Self 4 *

Ideal Self 5 *

Ideal Self 6 *

Ideal Self 7 *

Ideal Self 8 *

Ideal Self 9 *

Ideal Self 10 *

Appendix C

Published: March 2011

Taming the Wild

Only a handful of wild animal species have been successfully bred to get along with humans. The reason, scientists say, is found in their genes.

By Evan Ratliff

"Hello! How are you doing?" Lyudmila Trut says, reaching down to unlatch the door of a wire cage labeled "Mavrik." We're standing between two long rows of similar crates on a farm just outside the city of Novosibirsk, in southern Siberia, and the 76-year-old biologist's greeting is addressed not to me but to the cage's furry occupant. Although I don't speak Russian, I recognize in her voice the tone of maternal adoration that dog owners adopt when addressing their pets.

Mavrik, the object of Trut's attention, is about the size of a Shetland sheepdog, with chestnut orange fur and a white bib down his front. He plays his designated role in turn: wagging his tail, rolling on his back, panting eagerly in anticipation of attention. In adjacent cages lining either side of the narrow, open-sided shed, dozens of canids do the same, yelping and clamoring in an explosion of fur and unbridled excitement. "As you can see," Trut says above the din, "all of them want human contact." Today, however, Mavrik is the lucky recipient. Trut reaches in and scoops him up, then hands him over to me. Cradled in my arms, gently jawing my hand in his mouth, he's as docile as any lapdog.

Except that Mavrik, as it happens, is not a dog at all. He's a fox. Hidden away on this overgrown property, flanked by birch forests and barred by a rusty metal gate, he and several hundred of his relatives are the only population of domesticated silver foxes

in the world. (Most of them are, indeed, silver or dark gray; Mavrik is rare in his chestnut fur.) And by "domesticated" I don't mean captured and tamed, or raised by humans and conditioned by food to tolerate the occasional petting. I mean bred for domestication, as tame as your tabby cat or your Labrador. In fact, says Anna Kukekova, a Cornell researcher who studies the foxes, "they remind me a lot of golden retrievers, who are basically not aware that there are good people, bad people, people that they have met before, and those they haven't." These foxes treat any human as a potential companion, a behavior that is the product of arguably the most extraordinary breeding experiment ever conducted.

It started more than a half century ago, when Trut was still a graduate student. Led by a biologist named Dmitry Belyaev, researchers at the nearby Institute of Cytology and Genetics gathered up 130 foxes from fur farms. They then began breeding them with the goal of re-creating the evolution of wolves into dogs, a transformation that began more than 15,000 years ago.

With each generation of fox kits, Belyaev and his colleagues tested their reactions to human contact, selecting those most approachable to breed for the next generation. By the mid-1960s the experiment was working beyond what he could've imagined. They were producing foxes like Mavrik, not just unafraid of humans but actively seeking to bond with them. His team even repeated the experiment in two other species, mink and rats. "One huge thing that Belyaev showed was the timescale," says Gordon Lark, a University of Utah biologist who studies dog genetics. "If you told me the animal would now come sniff you at the front of the cage, I would say it's what I expect. But that they would become that friendly toward humans that quickly... wow."

Miraculously, Belyaev had compressed thousands of years of domestication into a few years. But he wasn't just looking to prove he could create friendly foxes. He had a

hunch that he could use them to unlock domestication's molecular mysteries. Domesticated animals are known to share a common set of characteristics, a fact documented by Darwin in *The Variation of Animals and Plants Under Domestication*. They tend to be smaller, with floppier ears and curlier tails than their untamed progenitors. Such traits tend to make animals appear appealingly juvenile to humans. Their coats are sometimes spotted—piebald, in scientific terminology—while their wild ancestors' coats are solid. These and other traits, sometimes referred to as the domestication phenotype, exist in varying degrees across a remarkably wide range of species, from dogs, pigs, and cows to some nonmammalians like chickens, and even a few fish.

Belyaev suspected that as the foxes became domesticated, they too might begin to show aspects of a domestication phenotype. He was right again: Selecting which foxes to breed based solely on how well they got along with humans seemed to alter their physical appearance along with their dispositions. After only nine generations, the researchers recorded fox kits born with floppier ears. Piebald patterns appeared on their coats. By this time the foxes were already whining and wagging their tails in response to a human presence, behaviors never seen in wild foxes.

Driving those changes, Belyaev postulated, was a collection of genes that conferred a propensity to tameness—a genotype that the foxes perhaps shared with any species that could be domesticated. Here on the fox farm, Kukekova and Trut are searching for precisely those genes today. Elsewhere, researchers are delving into the DNA of pigs, chickens, horses, and other domesticated species, looking to pinpoint the genetic differences that came to distinguish them from their ancestors. The research, accelerated by the recent advances in rapid genome sequencing, aims to answer a fundamental biological question: "How is it possible to make this huge transformation

from wild animals into domestic animals?" says Leif Andersson, a professor of genome biology at Uppsala University, in Sweden. The answer has implications for understanding not just how we domesticated animals, but how we tamed the wild in ourselves as well.

The exercise of dominion over plants and animals is arguably the most consequential event in human history. Along with cultivated agriculture, the ability to raise and manage domesticated fauna—of which wolves were likely the first, but chickens, cattle, and other food species the most important—altered the human diet, paving the way for settlements and eventually nation-states to flourish. By putting humans in close contact with animals, domestication also created vectors for the diseases that shaped society.

Yet the process by which it all happened has remained stubbornly impenetrable. Animal bones and stone carvings can sometimes shed light on the when and where each species came to live side by side with humans. More difficult to untangle is the how. Did a few curious boar creep closer to human populations, feeding off their garbage and with each successive generation becoming a little more a part of our diet? Did humans capture red jungle fowl, the ancestor of the modern chicken, straight from the wild—or did the fowl make the first approach? Out of 148 large mammal species on Earth, why have no more than 15 ever been domesticated? Why have we been able to tame and breed horses for thousands of years, but never their close relative the zebra, despite numerous attempts?

In fact, scientists have even struggled to define domestication precisely. We all know that individual animals can be trained to exist in close contact with humans. A tiger cub fed by hand, imprinting on its captors, may grow up to treat them like family. But that tiger's offspring, at birth, will be just as wild as its ancestors. Domestication, by

contrast, is not a quality trained into an individual, but one bred into an entire population through generations of living in proximity to humans. Many if not most of the species' wild instincts have long since been lost. Domestication, in other words, is mostly in the genes. Yet the borders between domesticated and wild are often fluid. A growing body of evidence shows that historically, domesticated animals likely played a large part in their own taming, habituating themselves to humans before we took an active role in the process. "My working hypothesis," says Greger Larson, an expert on genetics and domestication at Durham University in the United Kingdom, "is that with most of the early animals—dogs first, then pigs, sheep, and goats—there was probably a long period of time of unintentional management by humans." The word domestication "implies something top down, something that humans did intentionally," he says. "But the complex story is so much more interesting."

The fox-farm experiment's role in unraveling that complexity is all the more remarkable for how it began. The Soviet biology establishment of the mid-20th century, led under Joseph Stalin by the infamous agronomist Trofim Lysenko, outlawed research into Mendelian genetics. But Dmitry Belyaev and his older brother Nikolay, both biologists, were intrigued by the possibilities of the science. "It was his brother's influence that caused him to have this special interest in genetics," Trut says of her mentor. "But these were the times when genetics was considered fake science." When the brothers flouted the prohibition and continued to conduct Mendelian-based studies, Belyaev lost his job as director of the Department of Fur Breeding. Nikolay's fate was more tragic: He was exiled to a labor camp, where he eventually died.

Secretly, Belyaev remained dedicated to genetic science, disguising his work as research in animal physiology. He was particularly consumed with the question of how such an incredible diversity of dogs could have arisen from their wolf ancestors. The

answer, he knew, must lie at the molecular level. But even outside the Soviet Union, in the 1950s, the technology to sequence an animal's genome—and thereby try to understand how its genes had changed through history—was an impossible dream. So Belyaev decided to reproduce history himself. The silver fox, a fellow canid and close cousin of dogs that had never been domesticated, seemed the perfect choice.

Lyudmila Trut's first job as a grad student, in 1958, was to travel around to Soviet fur farms and select the calmest foxes she could find, to serve as the base population for Belyaev's experiment. The prohibition on genetic studies had thawed since Stalin's death in 1953, and Belyaev set up shop in Siberia at the newly minted Institute of Cytology and Genetics. Still, he was careful to frame the study only in terms of physiology, leaving out any mention of genes. Trut recalls that when Soviet leader Nikita Khrushchev arrived to inspect the institute, he was overheard to say, "What, are those geneticists still around? Were they not destroyed?" Protected by the careful politics of Belyaev's boss and favorable articles on genetics written by Khrushchev's journalist daughter, the fox-farm experiment quietly began.

By 1964 the fourth generation was already beginning to live up to the researchers' hopes. Trut can still remember the moment when she first saw a fox wag its tail at her approach. Before long, the most tame among them were so doglike that they would leap into researchers' arms and lick their faces. At times the extent of the animals' tameness surprised even the researchers. Once, in the 1970s, a worker took one of the foxes home temporarily as a pet. When Trut visited him, she found the owner taking his fox for walks, unleashed, "just like a dog. I said 'Don't do that, we'll lose it, and it belongs to the institute!'" she recalls. "He said 'just wait,' then he whistled and said, 'Coca!' It came right back."

Simultaneously, more of the foxes began to show signs of the domestication phenotype: floppy ears retained longer in development and characteristic white spots on their coats. "At the beginning of the 1980s, we observed a kind of explosion-like change of the external appearance," says Trut. The research had expanded to include rats in 1972, followed by mink and—for a brief period—river otters. The otters proved difficult to breed and the experiment was eventually abandoned, but the scientists were able to shape the behavior of the other two species in parallel with the foxes.

Just as the genetic tools became available to accomplish Belyaev's end goal of tracing that connection to the animal's DNA, however, the project fell on hard times. With the collapse of the Soviet Union, scientific funds began to dwindle, and the researchers could do little more than keep the fox population alive. When Belyaev died of cancer in 1985, Trut took over the research and fought to keep it funded. But by the beginning of the 21st century, she was in danger of having to shut down the experiment.

Around the same time, Anna Kukekova, a Russian-born postdoc in molecular genetics at Cornell, read about the project's struggles. She had been fascinated with the fox-farm work for years, and now decided to focus her own research on the experiment. With help from Utah's Gordon Lark and a grant from the National Institutes of Health (NIH), she joined Trut's effort to try and finish what Belyaev had started.

Not all the foxes on the farm in Novosibirsk, it turns out, are as friendly as Mavrik. Across the small road from him and his fellow tame foxes is an identical-looking shed full of wire crates, each holding one of what the researchers refer to as the "aggressive foxes." To study the biology of tameness, the scientists needed to create a group of decidedly untame animals. So in a mirror image of the friendly foxes, the kits in the aggressive population are rated according to the hostility of their behavior. Only the most aggressive are bred for the next generation. Here are the evil twins of the tail-

wagging Mavrik, straight out of a B-grade horror film: hissing, baring their teeth, snapping at the front of their cages when any human approaches.

"I'd like to draw your attention to this fox," says Trut, pointing to one snarling creature nearby. "You can see how aggressive she is. She was born to an aggressive mother but brought up by a tame mother." The switch, the result of the aggressive mother being unable to feed its kit, serendipitously proved a point: The foxes' response to humans is more nature than it is nurture. "Here," she says, "it's the genetics that change."

Identifying the precise genetic footprint involved in tameness, however, is proving extremely tricky science. First the researchers need to find the genes responsible for creating friendly and aggressive behaviors. Such general behavior traits, however, are actually amalgamations of more specific ones—fear, boldness, passivity, curiosity—that must be teased apart, measured, and traced to individual genes or sets of genes working in combination. Once those genes are identified, the researchers can test whether the ones influencing behavior are also behind the floppy ears and piebald coats and other features that characterize domesticated species. One theory among the scientists in Novosibirsk is that the genes guiding the animals' behavior do so by altering chemicals in their brains. Changes to those neurochemicals, in turn, have "downstream" impacts on the animals' physical appearance.

For now, though, Kukekova is focused on the first step: linking tame behavior to genes. Toward the end of every summer, she travels from Cornell to Novosibirsk to evaluate the year's newborn kits. Each researcher's interaction with a kit is standardized and videotaped: opening a cage, reaching a hand in, touching the fox. Later, Kukekova reviews the tapes, using objective measures to quantify the foxes' postures, vocalizations, and other behaviors. Those data are layered on top of a pedigree—records

that keep track of tame, aggressive, and "crossed" foxes (those with parents from each group).

The joint American-Russian research team then extracts DNA from blood samples of each fox in the study and scans for stark differences in the genomes of those that scored as aggressive or tame in the behavioral measures. In a paper in press in *Behavior Genetics*, the group reports finding two regions that are widely divergent in the two behavioral types and might thus harbor key domestication genes. Increasingly, it appears that domestication is driven not by a single gene but a suite of genetic changes. "Domestication," the paper concludes, "appears to be a very complex phenotype."

As it happens, 2,800 miles to the west in Leipzig, Germany, another laboratory is at the exact same juncture in understanding domestication genes in rats. Frank Albert, a researcher at the Max Planck Institute for Evolutionary Anthropology, obtained 30 descendants of Belyaev's rats (15 tame, 15 aggressive) in two wooden boxes from Siberia in 2004. "What we found were regions of the genome that influence tameness and aggression," says Albert. "But we don't know which genes cause these signals." Like Kukekova's group, he says, "we are in the process of whittling down the number."

Once either group is able to pinpoint one or more of the specific genetic pathways involved, they or other researchers can look for parallel genes in other domesticated species. "In a perfect situation, we'd like to define specific genes involved in tame and aggressive behaviors," says Kukekova. "Even when we find those, we will not know if they are the genes for domestication until we compare them in other animals."

Ultimately, the biggest payoff of the research may come from finding similar genes in the most thoroughly domesticated species of all: human beings.

"Understanding what has changed in these animals is going to be incredibly informative," says Elaine Ostrander, of the National Human Genome Research Institute at NIH. "Everyone is waiting with great excitement for what they come out with."

Not all domestication researchers believe that Belyaev's silver foxes will unlock the secrets of domestication. Uppsala University's Leif Andersson, who studies the genetics of farm animals—and who lauds Belyaev and his fellow researchers' contribution to the field—believes that the relationship between tameness and the domestication phenotype may prove to be less direct than the fox study implies. "You select on one trait and you see changes in other traits," Andersson says, but "there has never been proven a causal relationship."

To understand how Andersson's view differs from that of the researchers in Novosibirsk, it's helpful to try and imagine how the two theories might have played out historically. Both would agree that the animals most likely to be domesticated were those predisposed to human contact. Some mutation, or collection of mutations, in their DNA caused them to be less afraid of humans, and thus willing to live closer to them. Perhaps they fed off human refuse or benefited from inadvertent shelter from predators. At some point humans saw some benefit in return from these animal neighbors and began helping that process along, actively selecting for the most amenable ones and breeding them. "At the beginning of the domestication process, only natural selection was at work," as Trut puts it. "Down the road, this natural selection was replaced with artificial selection."

Where Andersson differs is in what happened next. If Belyaev and Trut are correct, the self-selection and then human selection of less fearful animals carried with it other components of the domestication phenotype, such as curly tails and smaller bodies. In Andersson's view, that theory understates the role humans played in selecting

those other traits. Sure, curiosity and lack of fear may have started the process, but once animals were under human control, they were also protected from wild predators. Random mutations for physical traits that might quickly have been weeded out in the wild, like white spots on a dark coat, were allowed to persist. Then they flourished, in part because, well, people liked them. "It wasn't that the animals behaved differently," as Andersson says, "it's just that they were cute." In 2009 Andersson bolstered his theory by comparing mutations in coat-color genes between several varieties of domesticated and wild pigs. The results, he reported, "demonstrate that early farmers intentionally selected pigs with novel coat coloring. Their motivations could have been as simple as a preference for the exotic or selection for reduced camouflage."

In his own hunt for domestication genes, Andersson is taking a close look at the most populous domesticated animal on Earth: the chicken. Their ancestors, red jungle fowl, roamed freely in the jungles of India, Nepal, and other parts of South and Southeast Asia. Somewhere around 8,000 years ago, humans started breeding them for food. Last year Andersson and his colleagues compared the full genomes of domesticated chickens with those of zoo-based populations of red jungle fowl. They identified a mutation, in a gene known as TSHR, that was found only in domestic populations. The implication is that TSHR thereby played some role in domestication, and now the team is working to determine exactly what the TSHR mutation controls. Andersson hypothesizes that it could play a role in the birds' reproductive cycles, allowing chickens to breed more frequently in captivity than red jungle fowl do in the wild—a trait early farmers would have been eager to perpetuate. The same difference exists between wolves, which reproduce once a year and in the same season, and dogs, which can breed multiple times a year, in any season.

If Andersson's theory is correct, it may turn out to have intriguing implications for our own species. Harvard biologist Richard Wrangham has theorized that we, too, went through a domestication process that altered our biology. "The question of what is the difference between the domestic pig and a wild boar, or the distinction between a broiler chicken and a wild jungle fowl," Andersson told me, "is very similar to the question of what is the difference between a human and a chimpanzee." Human beings are not simply domesticated chimpanzees, but understanding the genetics of domestication in chickens, dogs, and pigs may still tell us a surprising amount about the sources of our own social behavior. That's one reason the fox-farm research being conducted by Kukekova is underwritten by the NIH. "There are over 14,000 genes expressed in the brain, and not many are understood," she points out. Ferreting out which of those genes are related to social behavior is a tricky business; obviously one cannot perform breeding experiments on humans, and studies purporting to find innate differences in behavior among people or populations are at the very least problematic.

But delving into the DNA of our closest companions can deliver some tantalizing insights. In 2009 UCLA biologist Robert Wayne led a study comparing the wolf and dog genomes. The finding that made headlines was that dogs originated from gray wolves not in East Asia, as other researchers had argued, but in the Middle East. Less noticed by the press was a brief aside in which Wayne and his colleagues identified a particular short DNA sequence, located near a gene called WBSCR17, that was very different in the two species. That region of the genome, they suggested, could be a potential target for "genes that are important in the early domestication of dogs." In humans, the researchers went on to note, WBSCR17 is at least partly responsible for a rare genetic disorder called Williams-Beuren syndrome. Williams-Beuren is characterized by elfin features, a shortened nose bridge, and "exceptional gregariousness"—its sufferers are often overly friendly and trusting of strangers.

After the paper was published, Wayne says, "the number one email we got was from parents of children suffering from Williams-Beuren. They said, Actually our children remind us of dogs in terms of their ability to read behavior and their lack of social barriers in their behavior." The elfin traits also seemed to correspond to aspects of the domestication phenotype. Wayne cautions against making one-to-one parallels between domestication genes and something as genetically complex as Williams-Beuren. The researchers are "intrigued," he says, and hoping to explore the connection further.

In 2003 a young researcher at Duke University named Brian Hare traveled out to Novosibirsk. Hare is known for his work cataloging the unique behaviors of dogs and wolves, showing the ways in which dogs have evolved to follow human cues like pointing and eye movements. When he conducted similar tests on fox kits in Siberia, he found that they did just as well as puppies of the same age. The results, while preliminary, suggest that selecting against fear and aggression—what Hare calls "emotional reactivity"—has created foxes that are not just tame but that also have the doglike ability to engage with humans using their social cues.

"They didn't select for a smarter fox but for a nice fox," says Hare. "But they ended up getting a smart fox." This research also has implications for the origins of human social behavior. "Are we domesticated in the sense of dogs? No. But I am comfortable saying that the first thing that has to happen to get a human from an apelike ancestor is a substantial increase in tolerance toward one another. There had to be a change in our social system."

Hare's research came to mind on my last afternoon in Novosibirsk, as Kukekova, my translator Luda Mekertycheva, and I played with Mavrik in a pen behind the fox farm's research house. We watched him chase a ball and wrestle with another fox, then

run back so we could grab him up and let him lick our faces. But we all had flights to catch, and after an hour, Kukekova carried him back toward the sheds. Mavrik seemed to sense that he was headed back to his cage and whined with increasing agitation. Here was an animal biologically conditioned for human attention, as much as any dog is. Now that we'd provided it, I suddenly felt guilty for taking it away. The fox-farm experiment is, of course, just that: a scientific experiment. For decades the project has been forced to manage their population by selling off to real fur farms those foxes not friendly or aggressive enough to be research candidates. For the scientists, deciding which ones stay and which ones go is a harrowing process; Trut says she has long since passed on the job to others and stays away from the farm during selection time. "It is very difficult emotionally," she told me.

In recent years the institute has been working to obtain permits to sell the surplus tame foxes as pets, both domestically and in other countries. It would be a way not just to find a better home for the unwanted foxes, they suggest, but also to raise money for the research to continue. "The situation today is we are just doing our best to preserve our population," Trut says. "We do some genetic work with our partners in America. But this experiment has many more questions to resolve."

As for Mavrik, Luda Mekertycheva was so enthralled by the chestnut-colored fox and another playmate that she decided to adopt them. They arrived at her dacha outside of Moscow a few months later, and not long after, she emailed me an update. "Mavrik and Peter jump on my back when I kneel to give them food, sit when I pet them, and take vitamins from my hand," she wrote. "I love them a lot."

Appendix D

Facebook profiles and their effect on real/ideal self-discrepancy: An investigatory study.

I am currently a final year student of Psychology at Dublin Business School, and as part of the requirements of this degree it is necessary to complete a research project. The research project I am working on aims to investigate the possible relationship between Facebook profile activity and real/ideal self-discrepancy. In order to obtain the necessary information to complete this research I would kindly request your participation in completing the following questionnaires. Participation is completely voluntary and so you are not obliged to take part. If you do decide to participate, you may withdraw from completing the questionnaires at any time.

Participation is anonymous and confidential. Thus responses can not be attributed to any one participant. For this reason, it will not be possible to withdraw from participation after the questionnaire has been submitted. The questionnaires will be securely stored in electronic format on a password protected computer. It is important that you understand that by completing and submitting the questionnaire that you are consenting to participate in the study.

Should you require any further information about the research, please contact Sabrina Lane, [REDACTED] My supervisor, Ciarán McMahon, can be contacted at

Thank you for taking the time to complete this survey.

*** Required**

Will you participate in this study honestly and accurately? *

- Yes
- No

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Appendix E

Correlations

		INTERRATER BEFORE CONDITION	RESEARCHER BEFORE CONDITION
INTERRATER BEFORE CONDITION	Pearson Correlation Sig. (2-tailed) N	1 25	.947** 25
RESEARCHER BEFORE CONDITION	Pearson Correlation Sig. (2-tailed) N	.947** .000 25	1 25

** . Correlation is significant at the 0.01 level (2-tailed).

Correlations

		INTERRATER AFTER CONDITION	RESEARCHER AFTER CONDITION
INTERRATER AFTER CONDITION	Pearson Correlation Sig. (2-tailed) N	1 25	.967** 25
RESEARCHER AFTER CONDITION	Pearson Correlation Sig. (2-tailed) N	.967** .000 25	1 25

** . Correlation is significant at the 0.01 level (2-tailed).

Appendix F

ANOVA

Actual Ideal After Condition

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.359	2	7.179	1.525	.227
Within Groups	263.675	56	4.708		
Total	278.034	58			

ANOVA

Social Comparison Score Total

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	330.524	2	165.262	.913	.407
Within Groups	10137.510	56	181.027		
Total	10468.034	58			

Appendix G

ANOVA

Social Comparison Rank

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	131.749	2	65.874	1.597	.212
Within Groups	2309.438	56	41.240		
Total	2441.186	58			

ANOVA

Social Comparison Group Fit

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	58.673	2	29.337	1.394	.256
Within Groups	1178.310	56	21.041		
Total	1236.983	58			

ANOVA

Social Comparison Attractiveness

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	38.109	2	19.054	.726	.488
Within Groups	1469.077	56	26.234		
Total	1507.186	58			

Appendix H

Paired Samples Test

		Paired Differences						t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
					Lower	Upper				
Pair 1	Actual Ideal Before Condition - Actual Ideal After Condition	.271	1.298	.169	-.067	.609	1.605	58	.114	