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Gender differences in Facebook self-presentation: An international randomized study

Sigal Tifferet *, Iris Vilnai-Yavetz

Department of Business Administration, School of Economics and Business Administration, Ruppin Academic Center, Emek Hefer 40250, Israel

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ABSTRACT

Facebook is a popular social network that can be used for self-presentation. In the current study we examined gender differences in Facebook self-presentation by evaluating components of profile and cover photos. We used evolutionary psychology—a theory which holds many assumptions regarding gender differences—to draw hypotheses. In order to eliminate the pitfalls of self-reported data, we analyzed public data presented in Facebook pages of a random representative international sample of 500 Facebook users. As hypothesized, profile photos on Facebook differed according to gender. Males' photos accentuated status (using objects or formal clothing) and risk taking (outdoor settings), while females' photos accentuated familial relations (family photos) and emotional expression (eye contact, smile intensity and lack of sunglasses). Cover photos, however, did not show most of these gender differences, perhaps since they serve only as a supplement to the self-presentation that appears in the profile photos. These findings demonstrate that evolutionary theory rooted in the past can help us understand new social tools of the future.

1. Introduction

Social network sites (SNSs) such as Facebook, Twitter, and LinkedIn, have grown tremendously in recent years ("comScore," 2011). Among these, Facebook has emerged as the most popular website ("Top sites," 2013), with a reported one billion monthly active users, and 655 million daily active users ("Facebook," 2013) uploading 350 million new photos every day (Henschen, 2013). These users present both explicit data of themselves (such as age, gender and marital status) and implicit data (such as photos or degree of disclosure). These data reflect the perceptions, attitudes and behaviors of the users, allowing us to study the psychological mechanisms underlying self-presentation. In this study we investigate gender differences in self-presentation by analyzing implicit data depicted in profile and cover photos. The results of such an investigation bear both theoretical and practical consequences. Theoretically, there is an on-going debate regarding the existence and magnitude of behavioral gender differences (for a recent review see Stewart-Williams & Thomas, 2013). Investigating these differences as they are depicted on Facebook may offer a new perspective, since Facebook users are culturally diverse and their behavior is more naturalistic than that of conventional samples. Practically, identifying gender differences in self-presentation can assist a number of professionals in making well-informed choices in their websites. Firms, for instance, can improve their employee photos. Marketers can improve the images of their endorsers. Online dating sites can advise their customers how to present themselves on the site. Finally, users of SNSs may improve their choice of profile photo for social and professional self-presentation (Brown & Vaughn, 2011).

1.1. Self-presentation in Facebook

Self-presentation is one of the major motives driving activity in SNSs (Krämer & Winter, 2008). Facebook users can present themselves through explicit declarations, such as their interests or favorite music (Pempek, Yermolayeva, & Calvert, 2009), but they appear to rely more on implicit cues in posted photos (Zhao, Grasmuck, & Martin, 2008). When people evaluate the personality of a Facebook user, they base their impression mostly on the profile photo (Ivcevic & Ambady, 2012). Despite the salience of Facebook profile photos, however, there has been limited research on the topic.

Profile photos have practical implications since their appeal can raise the response rate to friendship requests (Tifferet, Gaziel, & Baram, 2012; Wang, Moon, Kwon, Evans, & Stefanone, 2010). Lately, in addition to the profile photo, Facebook has first enabled

* Corresponding author. Tel.: +972 9 8983035; fax: +972 9 8987604.
E-mail address: tifferet@ruppin.ac.il (S. Tifferet).

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and later required users to add a cover photo as part of the new Timeline format (Smith, 2012). These two photos allow the users to express and define themselves by projecting two similar or complementary images.

1.2. Gender differences in Facebook self-presentation

While many studies explore gender differences in Facebook users (see Table 1), the data on self-presentation is lacking. In the only study we found that targeted gender differences in Facebook self-presentation, Hum et al. (2011), found no significant gender differences in the number of profile pictures, the level of activity in the photos, the appropriateness of the photos or the number of subjects in them. This gender similarity may have resulted from choosing explorative hypotheses that were not theory-based. For instance, Hum et al. (2011) compared how frequently men and women posted posed photos versus candid photos. Theoretically, there is reason to hypothesize that women may pose differently than men, emphasizing different features (Vigil, 2009), but there is no apparent reason to hypothesize that there would be differences in the frequency of posing. In the current paper, we propose a number of specific hypotheses based on evolutionary psychology, a field with a long-standing history of research on gender differences (e.g., Archer, 1996; Archer, 2004; Bjorklund & Kipp, 1996; Buss, 1989; Schmitt et al., 2003; Wilson & Daly, 1985).

1.3. Evolutionary view of gender differences

Traditionally, gender differences in behavior have been attributed to cultural role expectations (e.g., Eagly, 1987). Evolutionary psychology views gender differences as rooted in genetic variations that arose millions of years ago through natural selection (Buss, 1995). According to evolutionary theory, men and women today have different behaviors since they had to deal with different challenges in the prehistoric past (especially in the fields of parenting and mating). For instance, in comparison to men, women take on a greater share of childcare in hunter-gatherer (Konner, 2005) and other traditional societies (Konner, 2010; Whiting & Edwards, 1988). This suggests that a similar division of labor was present in our ancestral past, and that ancestral women may have adapted traits that were beneficial for childcare. One example is the trait of empathy. A few million years ago, a woman with low levels of empathy may have had less success in raising her children to adulthood, since she was less sensitive to their needs. This would have lowered her chances to hand down her genes to future generations, including the genes responsible for lower empathy. Since men at that time probably played a smaller role in childrearing than women, their lack of empathy may have been less detrimental to the chances to pass on their genes. In this fashion, natural selection sculpted unique behavioral profiles for men and women. This is not to say that all women have higher empathy levels than men—only that women in average have higher empathy levels than men (Baron-Cohen & Wheelwright, 2004). This also does not suggest that women are better than men, since every trait has tradeoffs, and maternal empathy, for instance, may have a price of increased anxiety and depression (Tifferet, Manor, Constantini, Friedman, & Elizur, 2011).

The design of most studies in the field of gender differences does not allow researchers to determine whether the cause of the difference is social or evolutionary. In most cases both causes are in play—moreover, they interact (e.g., Schmitt, Realo, Voracek, & Allik, 2008). Over recent decades, social explanations for gender differences have increasingly been replaced by explanations that take an evolutionary approach (see for example Archer, 2004; Schmitt et al., 2008). Even Eagly (Eagly & Wood, 2011; Wood & Eagly, 2002) has moved to a more integrative biosocial model. In the field of cyberpsychology, however, the traditional social theory for gender differences still dominates (e.g., Dunn & Guadagno, 2011; Guadagno, Muscanell, Okdie, Burk, & Ward, 2011; Hum et al., 2011; Muscanell & Guadagno, 2012) with very few studies using the evolutionary framework (e.g., McAndrew & Jeong, 2012).

We now propose a number of gender differences in the self-presentation of Facebook users through their profile and cover photos, basing our hypotheses on evolutionary psychology.

1.3.1. Family relations

In comparison to men, women are more orientated towards familial relations, and are considered the keepers of the family (Salmon & Daly, 1996). One explanation of this phenomenon is that evolution has shaped females to be the main caregiver, as is evident in both industrialized (Belsky, Gilstrap, & Rovine, 1984; Lamb, Frodi, Hwang, & Frodi, 1982) and non-industrialized (Whiting & Edwards, 1988) societies. In addition, women have a higher parental confidence than men (Trivers, 1972), which may strengthen their bond to the child (Geary, 2005).

Kosinski, Stillwell, and Graepel (2013) predicted the gender of 58,000 volunteers by analyzing their Facebook Likes. 'Proud to be

Table 1
Studies assessing gender differences in Facebook users.

Study	Research method	Main gender finding
Acar (2008)	Student Survey	In comparison to men, women have more friends and spend more time on SNSs
Bonds-Raacke and Raacke (2010)	Student Survey	In comparison to men, women have less friends and are more likely to set their account to private
Fogel and Nehmad (2009)	Student Survey	Women disclose their phone number and address less than men
Hargittai (2008)	Student Survey	No difference in frequency of Facebook usage
Hum et al. (2011)	Student photo analysis	No difference in profile photos
Kosinski et al. (2013)	Analysis of Likes	Based on their Likes, males and females were correctly classified in 93% of cases
Lewis et al. (2008)	Student network analysis	No difference in network size
McAndrew and Jeong (2012)	International survey	In comparison to men, women spend more time managing their photo impression and in dealing with family photos.
Muscanell and Guadagno (2012)	Student survey	Women maintain relationships, men form new ones
Park, Kee, and Valenzuela (2009)	Student Survey	Women use Facebook for information purposes more than men
Pempek et al. (2009)	Student Survey	Women report having more friends than men
Valenzuela, Park, and Kee (2009)	Student Survey	Women are more likely to have a Facebook profile

a Mom' was one of the top Likes that predicted a female gender, while none of the top Likes predicting a male gender was related to parenting. This suggests that parenting has a unique significance for females on Facebook. In another study, an open vocabulary analysis of the Facebook messages of 750,000 volunteers found that females used more words relating to family than did males (Schwartz et al., 2013). An online international survey of SNS behaviors found that women reported appearing in more family photos and spending more time looking at pages of relatives (McAndrew & Jeong, 2012). This difference may also represent itself in the choice of photos people present in their Facebook profile and cover photos. We therefore hypothesize that:

H1. In comparison to adult women, adult men will post fewer family photos.

1.3.2. Status

In comparison to men, women are more impressed by the social and economic status of their partner (Li, Bailey, Kenrick, & Linsenmeier, 2002). In ranking the most important traits of a spouse, women rank a good earning capacity significantly higher than men do (Buss & Barnes, 1986). This trend has also been documented in cross-cultural settings, such as an analysis of traditional folktales from 48 different cultures (Gottschall, Martin, Quish, & Rea, 2004). A study of two villages in Bolivia found that prestigious men were more likely to marry early, secure extra-marital relations and re-marry (Von Rueden, Gurven, & Kaplan, 2011). This tendency is not limited to the offline realm. An analysis of 600 internet personal ads showed that women sought status, and men displayed it (Alterovitz & Mendelsohn, 2009). It appears, therefore, that women are more concerned about their spouse's status than men are. A high status signals both good genes and the potential to invest in the offspring (Geary, 2005; Griskevicius et al., 2007; Sundie et al., 2011), and is therefore more important to females, whose parental investment is higher than that of males, and less malleable (Geary, 2005). The female preference for high-status males has been documented in many cultures (Bird & Smith, 2005; Godoy et al., 2007) and in many non-human species (Gwynne, 2008; Schaedelin & Taborsky, 2009), suggesting that cultural explanations may not suffice.

Studying gender differences on Second Life, Guadagno et al. (2011) found that men were more likely than women to build and own objects. This is not surprising since one way of portraying status in modern society is by presenting status symbols such as cars (Belk, 2004) or fashion accessories (Han, Nunes, & Drèze, 2010). In mating situations men tend to increase their display of status symbols in order to increase their appeal to women (Griskevicius et al., 2007; Janssens et al., 2011), and they tend to do so more than women (Griskevicius et al., 2007). Another way of signaling potential status is by displaying a unique skill or ambition, a trait that women tend to prefer in their partners (Buss, 1989; Buss & Barnes, 1986). In one experiment, Tifferet et al. (2012) created two identical Facebook profiles of a man. The only difference between the two was that in one of the profiles the man was holding a guitar. The response rate of females was significantly higher for the man with the guitar, indicating that musical inclination makes a man more attractive. Since Facebook can be used for mating purposes (Tosun, 2012), we hypothesized that in order to portray status and skill:

H2a. In comparison to females, males will post more photos with objects.

Another way in which a man can signal his status is by wearing formal clothing, which can lead to a preference towards men in formal attire. For instance, one study showed that restaurant clients in business suits were served earlier, in comparison to men in casual dress, while no effect was documented for women's dress (Stead & Zinkhan, 1986). Professors' style of dress also interacts with gender, influencing how students perceive them. A formal dress style was associated with credibility in male, but not female professors, who were perceived as more credible when they dressed casually (Sebastian & Bristow, 2008). This preference towards men in suits may be especially strong for female appraisers. In deciding on which accountant to hire, women clients preferred photos of men and women in formal clothes, while men preferred those in casual attire (Chawla, Khan, & Cornell, 1992). This leads to the next hypothesis:

H2b. In comparison to females, males will post more photos in which they wear formal clothes.

1.3.3. Risk

A meta-analysis of 150 studies reported that males take more risks than females (Byrnes, Miller, & Schafer, 1999). Similar results have been reported in a review of economic experiments (Croson & Gneezy, 2009). A study on SNS users showed that men reported greater risk-taking attitudes and a higher likelihood of disclosing personal data such as phone number and home address (Fogel & Nehmad, 2009). Kosinski et al. (2013) predicted the gender of 58,000 volunteers by analyzing their Facebook Likes. Remarkably, all of the 10 top Likes that predicted a male gender were related to risk taking, while none of the Likes that predicted a female gender did. These Likes can be categorized into warfare (e.g., Modern Warfare 2, Band of Brothers, Deadliest warrior), sports (e.g., ESPN, X Games), and alcohol (Dos Equis). From an evolutionary perspective, risk aversion is likely to have been selected for in women: A cautious, risk-averse mother would have had better chances of protecting her children, and therefore passing on her genes to future generations. Ancestral men, on the other hand, would have benefited from risk taking, as they engaged in the competition for resources and mates (Wilson & Daly, 1985). This may explain the female attraction to men who take risks. For example, women are more likely to comply with requests from men wearing firefighter uniforms (Guéguen, 2009), perhaps due to their appeal as men who face danger.

Risk orientation can be reflected by the involvement in outdoor activities, especially those considered extreme. This orientation is stronger for men than for women. Hirschman (2003), for example, described the American value of "rugged individualism" characterizing stiff men embarking in outdoor activities (such as hunting), with their dogs, guns, and cars. The well-known "Marlboro man" cigarette advertising character—riding his horse alone in the mountains of the mid-west—became a symbol of this risk-taking masculine image. Hence we predict:

H3a. In comparison to females, males will post more outdoor photos.

Risky tendencies can also be portrayed by consuming alcohol, smoking, and using illegal drugs (Kraemer, 2000). Indeed, students who posted Facebook photos of themselves drinking alcohol were more likely to consume alcohol (Glassman, 2012). There appears to be a gender difference in the portrayal of substance use. A study on MySpace users (a smaller SNS than Facebook) found that public photos and videos of drug use, like marijuana, often included a single male. Alcohol drinking, however, often included groups of females (Morgan, Snelson, & Elison-Bowers, 2010). Based on the masculine tendency towards risk taking, we hypothesize that:

H3b. In comparison to females, males will post more photos with cigarettes or alcohol.

1.3.4. Emotional expression

A meta-analysis of 58 studies shows that females have an advantage in facial emotional expression, from as early as infancy, and through childhood and adolescence (McClure, 2000). For instance, women tend to smile more than men do, especially in when they know they are being observed (LaFrance, Hecht, & Paluck, 2003). This expressivity of emotions, including smiling and initiating eye contact, may be an adaptation selected for strengthening mother–child attachment and communication (Konner, 2010). Indeed, maternal emotional sensitivity is related to better mother–child attachment (Bigelow et al., 2010).

Emotional expressions may signal different traits in men and women (Vigil, 2009). In a study of mock interviews (Levine & Feldman, 2002), eye contact increased women's likeability, but decreased men's likeability. Perhaps eye contact signals sociability in women (making them more likeable) but signals dominance for men (making them less likeable). Emotional expressions also interact with gender to create an impression of high social status. Whereas women who display positive emotional expressions are rated of a higher social status; men who do so risk being rated as having low social status (Coats & Feldman, 1996). Again, these emotional cues may signal agreeableness in women, while signaling vulnerability in men. It is therefore reasonable that in a self-presentation context women would choose to present emotional expressions such as eye contact and smiling, while men would be less likely to do so. In the social media context, a large-scale study of Pinterest showed that women indeed tended to describe themselves using affectionate vocabulary, while men tended to use assertive vocabulary (Ottoni et al., 2013). Similar results were documented in a large-scale study of Facebook users showing that females use more words relating to affective processes and feelings than do males (Schwartz et al., 2013). Male Facebook users were more likely than females to report showing a serious expression in their profile photo (McAndrew & Jeong, 2012). Following these findings with regard to the presentation of emotional cues we predict that:

H4a. In comparison to females, males will post more photos hiding facial cues (e.g., photos in which they are wearing sunglasses).

H4b. In comparison to females, males will exhibit less eye contact in their photos than females.

H4c. In comparison to females, males will exhibit less smiling in their photos.

1.4. Methodological rationale

Almost all of the studies on Facebook gender differences use surveys in which participants in a convenience sample report their behavior on social networks (see Table 1). While this is a common method in the social sciences, it does have its downfalls. First, participants may not remember their network actions in the past (Brewer, 2000). Second, they may answer the survey in a socially desirable fashion (De Jong, Pieters, & Fox, 2010) rather than reporting accurately. Third, some interesting psychological behaviors are unconscious (e.g., Bargh & Morsella, 2008; Dijksterhuis, Smith, van Baaren, & Wigboldus, 2005), so a man may display a photo of himself with a sports car in the background without being aware of the reason for doing so. Fifth, most samples were limited to an American college students (e.g., Bonds-Raacke & Raacke, 2010; Fogel & Nehmad, 2009; Hargittai, 2008; Hum et al., 2011; Muscanell & Guadagno, 2012; Park, Kee, & Valenzuela, 2009; Pempek et al., 2009). These samples are highly biased, especially in light of the fact that 79% of Facebook users are from outside the U.S. and Canada ("Facebook 2013). It is not surprising that in a recent review of Facebook studies the authors concluded that, "*In general, it will be important to diversify the methodologies in use in Facebook research, which, at present, rely very heavily on subjective accounts*" (Anderson, Fagan, Woodnutt, & Chamorro-Premuzic, 2012, p. 42). For these reasons, we refrained from self-report scales and relied on analyzing public data presented in Facebook pages of a random representative international sample of Facebook accounts.

2. Methods

2.1. Procedure and research sample

We developed a scoring tool in order to assess the images in the personal profiles. Three independent coders identified relevant components of the profile and cover images in Facebook profiles. A literature review suggested additional relevant variables (Back et al., 2010; McAndrew & Jeong, 2012; Steele, Evans, & Green, 2009; Strano, 2008; Zhao et al., 2008) and resulted in a 40-item checklist. Three independent coders then used the checklist to code Facebook profile images. After discussing discrepancies, the coders constructed a final checklist comprised of 38 items. Once they established the coding checklist, an experienced rater—naïve to the study hypotheses—coded the 500 profiles in the fall of 2012. Most of the variables were based on objective measures (e.g., no smile, smile showing teeth, smile without teeth) so there was no need for additional independent coders.

We collected a sample of 550 randomly selected Facebook profiles, using ImageCrashers' software ("ImageCrashers – Random Facebook photos, pictures and images," 2012). This software displays random profiles selected from Facebook using Facebook Graph API. Of the 550 profiles, we excluded 50 profiles since they did not state the user's gender ($N = 45$), or represented a company, and not a personal user ($N = 5$). The study sample contained, therefore, 500 user profiles: 198 (39.6%) females and 302 (60.4%) males. See Appendix A for an example.

The number of analysed images differed according to the type of photo and the observed variable (see Fig. 1 for a flow chart of the sample structure). For instance, there is no point checking for emotional cues such as smiling if the photo shows only an object. The full sample included 500 profile photos in which we checked the presentations of objects and drugs. Of this sample, we only checked images with human photos ($n = 420$) for an outdoor setting. Of the human photo sample, we checked only photos with at least one adult ($n = 330$) for the presentation of images with family members. In addition, we checked only photos with one person, (child or adult; $n = 320$), for sunglasses, eye contact, smile intensity, and formal clothing. The same logic served for the cover photo sample.

2.2. Research variables

2.2.1. Demographics

From the basic information in the Facebook profile we recorded the reported *gender* and *year of birth* of the person. We categorized the *relationship status* into not committed (0 = single, it's complicated, in an open relationship, widowed, separated or divorced) and committed (1 = in a relationship, engaged or married).

2.2.2. Self-presentation

In order to identify family photos, we rated each photo showing a person according to the number of adults and children in it (based on the subjective impression from the photo), and the gender congruency of two adults in a photo. We defined *Families* as

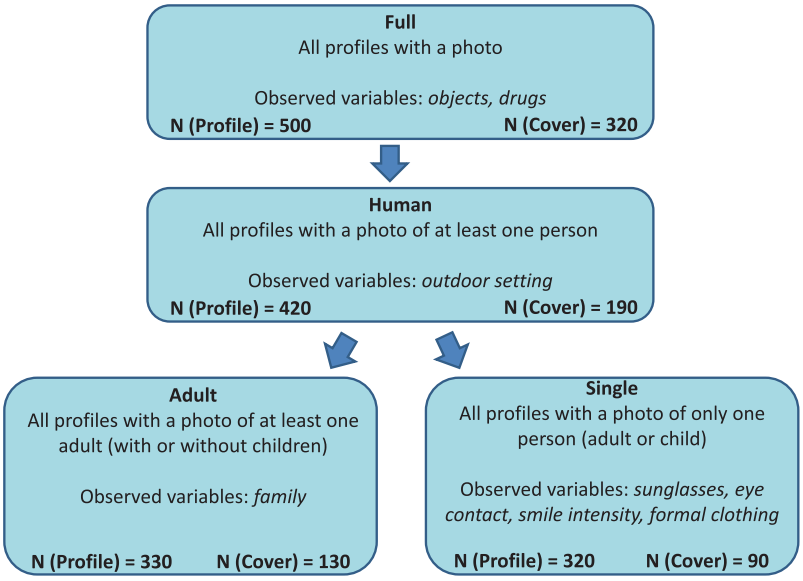

Fig. 1. Sample structure.

photos including one adult with one or more children, or two adults of incongruent gender with or without children. This is not a precise method for identifying families, since two adults of incongruent gender may be siblings or friends. However, these cases seem to be less likely.

The display of status was tested by the exhibit of objects or by the dress style of the individual. An *object* was recorded only if it was central in the photo (0 = no object, 1 = presence of an object). *Formal dress style* was rated only in photos that included one person, suggesting that the person in the photo is indeed the profile owner. Dress style was rated as 0 = minimal (swimming suit, bare torso), 1 = sportswear, 2 = weekday casual (jeans and T-shirt), 3 = smart casual or branded attire, or 4 = formal/semi-formal.

We associated risk-taking with photos of outdoor activities and with the presence of drugs. *Outdoor activity* was rated only for photos that included at least one person photographed indoors (0) or outdoors (1), for instance in nature or doing sports. The absence (0) or presence (1) of *drugs* such as cigarettes and alcohol was recorded in all photos.

We identified emotional expression through three variables that we measured only in photos that had one individual: *eye contact* (0 = not looking at the camera, 1 = looking at the camera), *smiling* (0 = no smile, 1 = slight smile (no teeth showing), 2 = smile with teeth), and *sunglasses* (signaling the hiding of emotional expression: 0 = eyeglasses or no eye cover, 1 = presence of sunglasses).

2.2.3. Facebook usage

In addition to the photo analysis data, for each Facebook account we recorded the following data: Number of Friends and Likes, adoption of the timeline format, and the mere disclosure of data such as: relationship status, Friends, Likes, and year of birth.

3. Results

3.1. Gender differences

We evaluated gender differences separately for profile photos and cover photos and also looked for differences in how people use profile and cover photos. Table 2 includes detailed results for each measured variable.

3.1.1. Gender differences in profile photo characteristics

As hypothesized, profile photos on Facebook differed according to gender. Males' photos accentuated status (using objects or formal clothing) and risk taking (outdoor settings), while females' photos accentuated familial relations (family photos) and emotional expression (eye contact, smile intensity and lack of sunglasses). One exception was that there was no significant gender difference in the portrayal of alcohol and cigarettes in the profile photos. This, however, may have resulted from the small overall number of profile photos displaying drugs (10/500).

3.1.2. Gender differences in cover photo characteristics

Contrary to our hypotheses, there were hardly any gender differences in the cover photos. The only clear difference was that women had a higher chance of displaying family photos than men. Other than that, there were no statistically significant differences in the display of status (using objects or formal clothing), risk taking (outdoor settings or drugs), and emotional expression (eye contact, smile intensity and lack of sunglasses).

3.1.3. Gender differences in Facebook usage

Aside from the study hypotheses, we checked for descriptive gender differences in Facebook usage. It appeared that there were no differences in the number of Friends ($t(399) = 0.40$, $p = .69$) or the number of Likes ($t(243) = -1.63$, $p = .10$) between male and female profiles. Females, however, were more likely to post a cover photo in the new timeline format ($\chi^2(1, N = 500) = 8.47$, $p = .004$, male to female Odds Ratio = 0.6). Next, we checked for gender differences in disclosure of personal information on public Facebook pages. There was no difference in the disclosure of the relationship status ($\chi^2(1, N = 500) = 1.10$, $p = .29$), the number of Friends ($\chi^2(1, N = 500) = 0.08$, $p = .78$), the year of birth ($\chi^2(1, N = 500) = 3.05$, $p = .08$, male to female OR = 1.9) or Likes ($\chi^2(1, N = 500) = 3.10$, $p = .08$, male to female OR = 1.5).

3.2. Differences between profile and cover photos

McNemar tests for paired data showed that while Facebook users often used their profile photo to show their own picture, they were likely to use their cover photo to convey additional data. Eighty-five percent of the profile photos had at least one human

Table 2
Gender differences in Facebook profile and cover photos.

Photo characteristics	Male $N = 302$	Female $N = 198$	Sample size	χ^2 (or U)	M:F Ratio (or r)
Profile photo					
H1: Families					
Families (%)	10	18	330	5.0*	0.5
H2: Status					
Objects (%)	29	19	500	6.1**	1.7
Formal clothing (*Mdn*)	3	2	320	(8071*)	(-.1)
H3: Risk					
Outdoors (%)	36	24	420	6.8**	1.8
Drugs (%)	2	2	500	0	1.0
H4: Emotional expression					
Sunglasses (%)	13	5	320	6.0*	3.0
Eye contact (%)	70	82	320	5.0*	0.9
Smile intensity (*Mdn*)	0	1	320	(16392**)	(.4)
Cover photo					
H1: Families					
Families (%)	12	34	130	9.0**	0.3
H2: Status					
Objects (%)	36	26	320	3.1	1.6
Formal clothing (*Mdn*)	2	3	90	(719)	(.2)
H3: Risk					
Outdoors (%)	41	40	190	0.0	1.1
Drugs (%)	4	3	320	0.3	1.4
H4: Emotional expression					
Sunglasses (%)	16	3	90	3.2	5.7
Eye contact (%)	60	52	90	0.6	1.4
Smile intensity (*Mdn*)	0	0	90	(855)	(.1)

Note. Chi-square tests were used to analyze families, objects, outdoor activity, drugs, sunglasses, and eye contact. Mann–Whitney U tests were used to analyze ordinal variables: formal clothing (0 = *minimal*, 1 = *sportive*, 2 = *casual*, 3 = *smart*, 4 = *formal*) and smile intensity (0 = *no smile*, 1 = *smile with no teeth showing*, 2 = *smile with teeth showing*). *Mdn* = Median. M:F = Male:female. Values of r were calculated based on male = 0.
* $p < .05$.
** $p < .01$.

in them, in comparison to only 60% of the cover photos ($\chi^2(1, N = 319) = 49$, $p < .001$). Sixty percent of the human profile photos showed one adult whose gender was congruent with that mentioned in the profile (suggesting a self-photo), in comparison to 31% of the cover photos ($\chi^2(1, N = 149) = 23$, $p < .001$). Cover photos, however, included a higher percentage of family photos (21% vs. 13%; $\chi^2(1, N = 94) = 4$, $p = .04$) and outdoor photos (57% vs. 48%; $\chi^2(1, N = 87) = 4$, $p = .04$).

4. Discussion

4.1. Gender differences in Facebook self-presentation

While there were clear gender differences in the photos that males and females chose to display as their profile photo, there were very few differences in the cover photos. This suggests that gender differences are highlighted in cases of self-presentation. It appears that Facebook users are likely to use their profile photo to present themselves physically, presenting a self-photo (approximately 60%), but they more often use their cover photo to extend their presentation to additional aspects of the self. Profile photos are smaller than the cover photos and appear in front them, creating the impression of an image of the self (the profile photo) and an image of the background (the cover photo). This background may reflect information such as psychographics (hobbies, values, life style, etc.) or social connections and relationships. This distinction between the two types of photos suggests that while the profile photo reflects the self and therefore shows gender differences, the cover photo reflects a wider social context which may be less prone to gender differences. Future research may study cover photos from a cross-cultural perspective to identify patterns.

4.1.1. Family relations

As hypothesized, women were more likely than men to post photos of their families in their profile photo. This may be because women tend to be more active in maintaining family relations (Salmon, 1999; Salmon & Daly, 1996). Starting from childhood, sisters are more positive towards their younger siblings than brothers are (J. Dunn, Deater-Deckard, Pickering, & Golding, 1999). These results continue into adulthood. In comparison to men, women describe more frequent and positive behavior towards their siblings (Riggio, 2006). In the online realm, these results complement those of McAndrew and Jeong (2012), who showed that women reported appearing in more family photos and spending more time looking at them.

4.1.2. Status

An additional gender difference was found in exhibiting status cues. Specifically, in comparison to females, males included more objects and formal attire in their profile photos. Since Facebook is a platform that is used for attracting mates, among other needs (Tosun, 2012), it is reasonable that males would attempt to display status signals that would make them appear more attractive. These results are similar to those of other studies showing that males emphasize their status when presenting themselves. For instance, a study on 700,000 Pinterest users found that in comparison to women, men used more words associated with money, power and status (Ottoni et al., 2013).

4.1.3. Risk

We expected males to portray more risk-taking signals than females. Indeed, males did present more photos of outdoor activity in comparison to females. Being out in nature may trigger feelings of apprehension and anxiety (Bixler & Carlisle, 1994). Previous research has shown that men are less intimidated by these threats, and are more willing to take part in them and to find them fascinating (Hoff & Maple, 1982; van den Berg & ter Heijne, 2005; Zuckerman, Ulrich, & McLaughlin, 1993). This may be an adaptive strategy intended for inquisitive study of the territory. Posting an outdoor photo allows the viewer to make a more

accurate personality judgment of the user (Steele et al., 2009), and therefore may be a good way to convey adventurousness, risk taking and sensation seeking.

Contrary to our hypothesis, we did not find a gender difference in the presentation of cigarettes or alcohol in the profile photos. This may have resulted from the small overall number of profile photos displaying drugs, found in only 2% of the profiles. This low percentage suggests that Facebook presentation reforms to social norms, as happens in identifiable online settings (Douglas & McGarty, 2001).

4.1.4. Emotional expression

As hypothesized, we found that in comparison to males, females exhibit more facial cues, eye contact, and smiles in their profile photos. This suggests that women express more emotions in their Facebook profiles, and hide less. This gender difference may arise from the differential selective forces that men and women faced throughout evolution. Women, as the main caregivers, may have needed to develop skills for attachment, sensitivity and communication. Men, on the other hand, may have had a greater need to display power and dominance in order to maintain their status (Dovidio, Brown, Heltman, Ellyson, & Keating, 1988; Dovidio, Ellyson, Keating, Heltman, & et al., 1988) and therefore may be less likely to show emotional expressions such as smiling. In fact, the magnitude of smiling in men appears to be negatively correlated to the levels of the male hormone testosterone (Dabbs Jr., 1997; Dabbs Jr., Hargrove, & Heusel, 1996). Archer (2006) claims that in situations that highlight reproduction, men's testosterone levels soar. Since Facebook is indeed used for mating purposes, men may tend to choose photos that illustrate their masculinity: hence, less smiling. Women, on the other hand, may attempt to portray a soft feminine image, which calls for positive emotional cues such as smiling and eye contact. While one can claim that female expressivity is a cultural expectation, a cross-cultural study of 26 cultures finds that in most cultures women are higher in warmth than men (Costa, Terracciano, & McCrae, 2001). Therefore, expressivity in women may have an evolutionary basis.

4.1.5. Facebook usage

The gender differences found in Facebook impression management are greater in image choice than in Facebook usage parameters, such as the number of Friends or disclosure of information. There are mixed findings regarding gender differences in the number of Facebook Friends (Acar, 2008; Bonds-Raacke & Raacke, 2010; Lewis, Kaufman, Gonzalez, Wimmer, & Christakis, 2008; McAndrew & Jeong, 2012; Pempek et al., 2009), and our study found no such difference. We also did not find any gender differences in disclosure, although some studies have documented them in the past (Bonds-Raacke & Raacke, 2010; Fogel & Nehmad, 2009; Mesch & Beker, 2010; Nosko, Wood, & Molema, 2010).

4.2. International sample

In our study, a number of differences were found between males and females. It should be noted that the present study used a representative random international sample, as opposed to past studies that were usually based on a more homogenous sample. In this case, gender differences cannot easily be attributed to cultural explanations, since the participants were from diverse cultures. Of course, this does not mean that there are no cultural causes for gender differences, only that there may be evolutionary-based ones as well. In a large study of 26 cultures with 23,000 participants, women scored modestly higher on neuroticism, agreeableness and warmth, while men scored higher on assertiveness (Costa et al., 2001). Interestingly, gender differences in the study were most pronounced in European and American cultures, in which sex-role differences are relatively small. As Costa et al. point out; this suggests that cultural factors are not responsible for the differences in personality traits between men and women.

4.3. Limitations

4.3.1. Congruency of online and offline behavior

One can claim that the behavior on Facebook and other SNSs is detached from that in the offline realm, and therefore the study results are limited to online behavior. Past studies, however, have shown otherwise (Gosling, Gaddis, & Vazire, 2007; Vazire & Gosling, 2004). There is a high congruency between a person's personality, as explained by standardized personality scales, and their personality impression on SNSs (Back et al., 2010), or on other online platforms such as personal web pages (Marcus, Machilek, & Schutz, 2006). A recent study (Kosinski et al., 2013) even succeeded in predicting the demographics and psychological traits of volunteers using their Facebook Likes. They found that the type of Likes a person made could predict with high certainty his or her sexual orientation, race, religion, political affiliation, alcohol consumption and even suggest some psychological traits like intelligence or openness. Other Facebook behaviors such as the quantity of Likes, uploaded photos, and status updates can also predict a person's personality (Bachrach, Kosinski, Graepel, Kohli, & Stillwell, 2012). This is amplified by the fact that Facebook is not a platform that allows anonymity (Douglas & McGarty, 2001), and as such we can expect people to behave similarly to the way they behave when others watch them in the real world.

4.3.2. Self-photos

One can also claim that the profile photos which we analyzed were not of the profile owner, but of someone else. In this type of study it is indeed difficult to ascertain who is photographed in the profile photo. It did seem highly likely that when one adult was shown in the photo, the photo belonged to that user, since in 97% of these photos the gender of the person in the photograph was congruent to that stated in the profile settings.

4.3.3. Alternative explanations

The study results support the hypotheses deriving from evolutionary theory; they do not, however, favor evolutionary explanations over conventional social ones. For instance, we found that females were twice more likely than males to present family photos in their profile and cover photos. Our rationale was that evolution has selected a higher familial inclination in women than in men, since they were the main caregivers throughout human prehistory. Our findings, nonetheless, can support alternative social theories as well. Social role theory claims that women are more likely to be in contact with their families since they are socialized to do so from an early age (Eagly, Wood, & Diekman, 2000). Hence, the fact that females present more family photos on Facebook can result from either or both innate drives and social norms.

In the present study—as in most studies in the social sciences—we can demonstrate the presence and magnitude of gender differences, but we cannot single out one of these two theoretical explanations. In order to differentiate between evolutionary and social theories, unique methods are required. For instance, studies showing that a gender difference is apparent at infancy can favor evolutionary explanations over social ones, since societal influences have been limited in time. Female infants, for example, show higher levels of facial expression processing than male infants (McClure, 2000). Another option is to show that a gender difference exists not only in humans, but in other animals as well. Similarly to humans, for example, male rhesus monkeys prefer wheeled toys, while the females have a wider range of preferences (Hassett,

Siebert, & Wallen, 2008). A third methodological option is to show that a gender difference is cross-cultural and not limited to a certain culture and its norms. Schmitt et al. (2008), for instance, measured personality traits in 55 cultures and found that women reported higher levels of neuroticism, extraversion, agreeableness, and conscientiousness than did men in most of the cultures. In the present study we applied the cross-cultural methodology by randomly sampling Facebook users from around the world; yet we do not claim that our sample is culturally unbiased, since Facebook users may be more technologically inclined than non-users.

4.4. Conclusions and future studies

The present study, using evolutionary theory to predict gender differences in the self-presentation tactics of Facebook users, is an example showing how SNSs give us an opportunity to study human behavior from a new perspective. Apparently, people feel more comfortable disclosing information online than offline (Christofides, Muise, & Desmarais, 2009) and at the same time tend to present real identities in public SNSs like Facebook (Zhao et al., 2008). Since there is a multitude of information depicted in those Facebook profiles that are open to the public, it can be harvested directly for social science research. Survey-based studies, which were prevalent in the past, are no longer the best way to conduct research. Vast quantities of digital information are readily available, allowing researchers to collect behavioral data from large international random samples and eliminating the pitfalls of self-report questionnaires. A recent example includes Ottoni et al.'s (2013) study of 220 million items generated by about 700,000 Pinterest users, which they use to describe gender differences.

Evolutionary psychology is also fertile ground for a multitude of theory-driven hypotheses (see reviews in Caporael, 2001; Confer et al., 2010; Nettle, Gibson, Lawson, & Sear, 2013). As the field grows it illuminates diverse topics such as consumer behavior (Saad, 2007, 2013), law (Petersen, Sell, Tooby, & Cosmides, 2012), religion (Atran, 2002; Wilson, 2003) and literature (Carroll, 2004, 2011). Scholars in the field of cyberpsychology can expand their theoretical knowledge by applying evolutionary tenets such as mate selection, kinship, altruism and more to derive new theory-driven hypotheses. Combining knowledge in these fields with analysis of data presented in SNSs can help researchers better understand the social and marketing tools of the future.

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Appendix A

An illustration of Facebook profile and cover images.

Appendix B

Facebook profile and cover images coding list.

No.	Name	Variable content	Which account should be checked?
1	Subject	Serial number	All
2	ID	Facebook ID (URL)	All
3	Gender	0. Male 1. Female	All
4	Relationship Status	0. Not committed (single, it's complicated, in an open relationship, widowed, separated, divorced). 1. Committed (in relationship, engaged, married)	All
5	Year of Birth	Year	All
6	Friends	Number of friends	All
7	Likes	Number of likes	All with Timeline
8	P_Design	0. No profile photo/blank 1. Original photo/image 2. Artistic design (black-white, drawing)	All
9	P_Image	0. Non-human photo or image	With profile image

(*continued on next page*)

Appendix B (*continued*)

No.	Name	Variable content	Which account should be checked?
		1. Human profile photo	
10	P_Non_Human	0. Animated/cartoon/ drawn character 1. Animal/s 2. Object 3. Landscape 4. Other	Non-human
11	P_Adult	Number of adults	Human
12	P_Kids	Number of kids	Human
13	P_Gender	0. All male 1. All female 2. Mixed 3. Unclear	Human
14	P_Pet	0. No pet 1. With pet	Human
15	P_Object	0. No Object 1. Sport Object (skateboard, tennis bat) 2. Vehicle (car, bike, motorbike, tractor) 3. Musical Object (guitar, microphone) 4. Electronic Object (ipad, cell phone). 5. Smoking or Alcohol (cigarette, beer) 6. Other	All
16	P_Smile	0. No Smile 1. Smile without teeth 2. Smile with teeth	Only one person
17	P_Eye_Cover	0. None 1. Glasses 2. Sunglasses 3. Other	Only one person
18	P_Head_Cover	0. None 1. Head cover that doesn't cover the face 2. Head cover that partially cover the face 3. Head cover that fully covers the face	Only one person
19	P_Eye_Contact	0. Not looking at camera 1. Looking at camera	Only one person
20	P_Body	0. Partial face 1. Face only 2. Face and shoulders 3. Upper part of body 4. Full body 5. Other	Only one person
21	P_Dress	0. Minimal (swimming suit, bare torso) 1. Sportswear (training, running shorts) 2. Weekday casual (jeans and T-shirt) 3. Smart casual or branded attire 4. Formal/semi-formal 5. Other	Only one person
22	P_Situation	0. Indoors 1. Outdoors	Human
23	Timeline	0. No 1. Yes	All
24	C_Design	0. No cover photo / blank 1. Original photo/image 2. Artistic design (black-white, drawing)	With cover image
25	C_Image	0. Non-human photo or image 1. Human cover photo	With cover image
26	C_Non_Human	0. Animated/cartoon/ drawn character 1. Animal/s 2. Object 3. Landscape 4. Other	Non-human
27	C_Adult	Number of adults	Human
28	C_Kids	Number of kids	Human
29	C_Gender	0. All male 1. All female 2. Mixed 3. Unclear	Human
30	C_Pet	0. No pet 1. With pet	Human
31	C_Object	0. No Object 1. Sport Object (skateboard, tennis bat) 2. Vehicle (car, bike, motorbike, tractor) 3. Musical Object (guitar, microphone) 4. Electronic Object (ipad, cell phone). 5. Smoking or Alcohol (cigarette, beer) 6. Other	All
32	C_Smile	0. No Smile 1. Smile with teeth 2. Smile without teeth	Only one person
33	C_Eye_Cover	0. None 1. Glasses 2. Sunglasses 3. Other	Only one person
34	C_Head_Cover	0. None 1. Head cover that	Only one person

Appendix B (*continued*)

No.	Name	Variable content	Which account should be checked?
		doesn't cover the face 2. Head cover that partially cover the face 3. Head cover that fully covers the face	
35	C_Eye_Contact	0. Not looking at camera	Only one person
		1. Looking at camera	
36	C_Body	0. Partial face	Only one person
		1. Face only 2. Face and shoulders 3. Upper part of body 4. Full body 5. Other	
37	C_Dress	0. Minimal (swimming suit, bare torso) 1. Sportswear (training, running shorts) 2. Weekday casual (jeans and T-shirt) 3. Smart casual or branded attire 4. Formal/semi-formal 5. Other	Only one person
38	C_Situation	0. Indoors 1. Outdoors	Human

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