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Curating Social Image

Experimental Evidence on the Value of Actions and Selfies*

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Abstract:

We manipulate the information subjects can share on the web concerning socially sensitive actions (public good contribution) and visibility (selfie) to determine the effect on social image, as captured by the price subjects demand for publication. The overall conclusion from the experiment is that theory about social reputation can predict subjects' social-signaling behavior. People take costly decisions to "filter" information about themselves (in retrospect) before it is published. We also report results of a more exploratory nature and find that taking a selfie has a strong negative impact on cooperation among frequent selfie takers, but not on other subjects.

Keywords: social image; selfie; cooperation; signaling

JEL codes: C90; C91; D80; D82

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1. Introduction

New technology has dramatically changed the way people curate their social image. Founded in 2004, popular social networking site Facebook has expanded in a period that coincides with the entry of smartphones into the market, most notably the iPhone in 2007. People started carrying a smartphone wherever they went, giving unprecedented access to social media, and with the release of Apple's front-facing camera in 2010 iPhone users began taking pictures of themselves. By 2015, 1.2 billion "selfies" were taken yearly in the UK alone (Ofcom, 2015).[1]

People's pre-occupation with social media and their online image has potentially large economic consequences. Social media consumes an increasing share of people's leisure time and one in three Americans admit to using social media during work time to take a mental break (Pew Research Center, 2016). Using a conservative estimate of 20 minutes daily Facebook activity, the economic loss of active Facebook usage to employers is nearly a trillion USD, an economic impact that is difficult to ignore.[2] The economic impact on leisure time activities is probably much larger but is more difficult to estimate. In recent years, a new industry has flourished which monetizes people's desire to maintain their online reputation. For example, some websites re-post official arrest mugshots and then charge a high fee for those wanting to remove them, while other businesses (often run by the same owner as the websites) offer mugshot removal as part of a reputation management service.[3] Furthermore, the billions of selfies taken yearly have spawned a market in accessories and create a great

[1] "Selfie" was chosen as the Oxford Dictionaries Word of the Year in 2013. It is defined as "a photograph that one has taken of oneself, typically one taken with a smartphone or webcam and uploaded to a social media website".
[2] http://www.businessinsider.com/how-much-time-do-people-spend-on-facebook-per-day-2016-4?r=US&IR=T&IR=T and http://www.cnbc.com/2016/02/04/facebook-turns-12--trillions-in-time-wasted.html, both accessed 10 August 2016.
[3] http://www.nytimes.com/2013/10/06/business/mugged-by-a-mug-shot-online.html, accessed 31 October 2016.

potential as a marketing tool.[4] Remarkably, little has been done in the existing economic literature to understand the new digital environment where social image is produced.

A large part of social media interaction is shaped by how people edit and then decide what to upload to their profile to be viewed by others, as dictated by the image they want to project. If indeed people selectively edit their image before publishing, and are willing to pay to remove undesirable information, economic theory would suggest that this process reflects how people value different pieces of information. We conduct a framed field experiment with student subjects designed to capture how image concerns affect people's valuation. Subjects play the public good game (henceforth PG), and are subsequently asked to state their reservation prices for publishing different sets of information on a public webpage using the Becker-DeGroot-Marschak (BDM) mechanism. Each set consists of their name and the fact that they participated in an economic experiment, with various combinations of their PG contribution and their selfie (for a random subset of subjects who are asked to take a selfie prior to the PG). Subjects are thus able to adjust their reputation and level of visibility ex-post. To the best of our understanding this sequential design and the selfie-taking under experimental control make our study unique in comparison to previous experiments on social image and the associated audience effect. As will be shown later this design allows us to test if recently developed theoretical mechanisms about image concerns (see Bénabou and Tirole, 2006) can help us predict behavior in a controlled environment that has more similarities to modern social media interaction than previous studies.

Selfies and information about socially sensitive acts (such as PG contributions) are two important "input" components of people's social image.[5] From a theoretical

[4] http://www.bloomberg.com/news/articles/2014-12-31/selfie-sticks-rule-holiday-season-as-musthave-accessory and http://www.forbes.com/sites/cherylsnappconner/2015/07/17/why-selfies-should-be-part-of-your-marketing-plan-and-9-new-photo-apps/#43327fdd4bbf, both accessed 5 August 2016.

[5] One might argue that a selfie is just like any other photo portraying a person, but what distinguishes a selfie from other types of photographs taken of the same subject is the control retained by the subject. The selfie signifies a sense of human agency (Senft and Baym, 2015), and this consequentially allows more freedom for

perspective we argue that the selfie can be thought of as an instrument to impact the "visibility" of a social signal, and information about socially sensitive acts can be viewed as the "moral" content of the signal. Information that enhances reputation such as a high PG contribution should, according to Bénabou and Tirole (2006), lead to a higher willingness to publish and lower bids, and vice versa. The addition of the selfie is hypothesized to amplify these effects. Assuming that valuations are additive and not too negatively correlated, which we think are reasonable for our sample, then we can also make the (less obvious) prediction that image concerns will increase the variation in prices demanded when PG contribution or selfie is added to the publication. We also think that social media habits, the rating of the selfie, and other personal characteristics may affect a subject's willingness to publish their information.

Our contributions are the following. We are able to elicit subjects' valuations for publishing potentially sensitive information sets, as reflected in the BDM bids, and isolate the premium demanded for various components of social image. We show that these can to a large extent be explained by theory of social reputation. The price demanded for publishing information containing PG contribution is negatively correlated with PG contribution itself. Not surprisingly, the more subjects free-ride the more unwilling they are to publish their contribution, especially with a selfie. The premium demanded for adding PG contribution to the publication, net of individual privacy concern, is similarly found to increase as PG contribution decreases. These are in line with the theoretical predictions although both effects are not consistently highly significant. The effect of adding a selfie to the publication of PG contribution is a highly significant increase in the price demanded, and this premium is strongly negatively correlated with PG contribution. This shows that when information is more visible with a selfie, subjects are more motivated to hide lower PG contribution, even if

personality expression. Qiu et al. (2015), e.g., found that people express their personality differently in the context of selfies than they do in other types of photos, and propose that this difference is due to impression management of social media users.

the subject is already identifiable through her name. All these findings are consistent with predictions from the model by Bénabou and Tirole (2006), where the visibility of behavior increases the reputational impact, and further provide empirical evidence that people are prepared to take costly actions to filter public information about themselves. We are also able to confirm the less obvious prediction that the variance of bids increases when PG contribution or selfie is added, showing the presence and heterogeneity of image concerns in individuals.

Our novel design also allows us to explore some questions that we believe are new but where the theoretical predictions are less clear. One question to further explore is the cause of the "selfie effect". As noted previously, adding a selfie affects the distribution of BDM bids. This raises the question of whether this is caused by the selfie as such (e.g., through concerns about physical appearance) or if it is information about PG contribution that gets much more sensitive in combination with a selfie. To investigate this we also study the premium for adding PG contribution information with and without a selfie. We find that both the premium for PG contribution information and its variance drop when a selfie is included which suggests that concerns for the selfie itself (e.g., the visual physical appearance) crowd out social image concerns for behavior. Put simply, when looks enter social behavior becomes less important.

We can also study how selfie-taking per se affects behavior, in particular cooperation. Our finding is that taking a selfie does in fact have a negative impact on cooperation. However, the prevalence of this effect depends on how often subjects take selfies. Whereas taking a selfie does not have any significant negative impact among the subjects in general, there is a strong negative effect among subjects who take a selfie at least monthly or weekly. This is in line with the behavioral addiction hypothesis, which suggests

that among frequent selfie-takers, taking a selfie triggers psychological mechanisms that crowd out other concerns, including social ones.

The outline of the paper is as follows. We start by generating our main hypotheses in a theory section and then describe the experimental design in section 3. We present our main results in section 4. In section 5 we motivate our exploratory questions and present the results we get. The paper ends with concluding remarks in section 6.

2. Theory and Hypotheses

2.1 Social-signaling through socially sensitive actions

We suspect that our valuation of publicity depends on whether or not it enhances our reputation. In the experiment, valuation of publicity will be elicited as BDM bids for the experimenter's right to publish the subject's name and participation information. We next add information about the subject's contribution in the PG, which is assumed to be socially sensitive as it may either enhance or damage reputation.

Our investigation about the subjects' willingness to publish specified information sets about themselves and their behavior, with or without a selfie, is related to previous research on audience effects and social image.[6] People want to be seen as not only prosocial, but also as having low concerns for material incentives (Bénabou and Tirole, 2006). This gives rise to the "audience effect", whereby the existence of or an increase in the size of an audience leads to an increase in prosocial behavior, and fairness norms (Bernheim, 1994, Andreoni and Bernheim, 2009).[7][8] Experimental evidence of image-seeking in the presence of

[6] There is a set of studies on the valuation of privacy, which is somewhat related to the present paper. The results in these studies are mixed and demonstrate that there is overall a high level of heterogeneity in privacy valuation (see Acquisti and Grossklags, 2005, Beresford et al., 2012, Acquisti et al., 2013, Benndorf and Normann, 2014, and Schudy and Utikal, 2015). However, these studies are somewhat peripheral to ours since they investigate general concerns and absolute valuations of privacy, while we are studying changes in privacy valuation when the set of published information is varied, by including selfies and/or cooperative behavior in the lab, which according to theory is sensitive for a subject's social image.

[7] It can also be pointed out that an "increase" in the audience can increase the possibility of reciprocation in a repeated game setting.

an audience can be seen in e.g. Andreoni and Petrie (2004), where subjects contribute more in a PG when their contribution and photo are displayed to other group members. Subjects are also found to state a higher willingness to pay for a Fairtrade product when choices are made in public than private (Friedrichsen and Engelmann, 2014, Teyssier et al., 2015). Additionally, making subjects publicly count their PG contribution significantly increases cooperation (Rege and Telle, 2004).[9]

All the above studies are based on comparisons of behavior given that subjects are fully aware of their degree of anonymity prior to making their choices. Such a design makes sense to study the impact of between-subject treatment effects of, e.g., social pressure. However, increasing publicity ex-ante makes it difficult to parse out agents' image concerns from their intrinsic prosociality. In our study, we employ a sequential design where subjects have the possibility to ex-post adjust their degree of anonymity *after* they have chosen their PG contribution, thus capturing an important aspect of modern social media interactions while making the dissonance between different motivations more prominent. Historically the degree of anonymity has been determined by the physical context a subject is acting in, which has been difficult to affect, whether it is at a populous city square, on an abandoned dirt track, or in a given lab setting. Subjects can thus automatically adjust their behavior in the different contexts according to the reputational concerns and personal gains. In contrast, today people have a relatively large freedom to decide what actions and contexts that they share with others on social media. This possibility gives rise to a more prominent dissonance concerning the action taken and the image the person wants others (and probably also herself) to see, leading to an internal conflict which has been recognized by prominent psychologists (see e.g.,

[8] Alternatively, the potential presence of an audience may also lead individuals to constrain their behavior. This phenomenon, coined the "chilling effect", has been established not only in online social media interaction (Marwick and Boyd, 2011), but it also extends offline where subjects normalize their behavior anticipating that their actions may be published online (Marder et al., 2016).

[9] More explicit identification of group members, for example by asking subjects in the same group to stand up and look at each other, not surprisingly increases cooperative behavior (see, e.g., Frey and Bohnet, 1997 and Bohnet and Frey, 1999) by lowering social distance (Hoffman et al., 1996).

Festinger, 1957/1962 and Higgins, 1987) and which the subject tries to resolve in different ways (e.g., by denial, justification and/or change of beliefs). In our experiment, the subject first plays the PG without knowing about the possibility of publishing her contribution, thus minimizing image concern and leaving a "wiggle room" with respect to her social reputation (Dana et al., 2007). We then induce dissonance by surprising the subject with the opportunity to publish information about her behavior.[10] The only way to resolve this dissonance and at the same time maintain her reputation is by choosing to remain anonymous, at the expense of experimental earnings. The sequential design therefore allows for within-subject elicitations of social image valuation: the BDM bid may be regarded as an indicator of the individual subject's unwillingness to openly confess (their PG contribution) under varying degrees of visibility.

To see how the above factors combined form our experimental predictions, it is instructive to use Bénabou and Tirole's (2006) (henceforth BT) simplest model of social signaling.[11] We provide the intuition for our hypotheses here, while theoretical motivations for the predictions can be found in the Appendix. In this model subjects are assumed to choose a level of contribution to a public good to maximize the following utility:

$$U(a,y) = \left(v_a + v_y y\right)a - C(a) + R(a,y)$$

where

$$R(a,y) = x\left[\gamma_a E(v_a|a,y) - \gamma_y E\left(v_y\middle|a,y\right)\right].$$

Here, v_a and v_y are the subject's intrinsic valuations of contributing to a public good a and of material reward ya respectively, $C(a)$ is the utility cost of contributing to the public good and $R(a,y)$ is the so called reputation function which depends on x, the visibility of the PG

[10] The ex-post determination of anonymity is also employed in the design of a tax evasion experiment by Casal and Mittone (2016), however subjects are aware from the start that they will have the possibility to pay to remain anonymous and consequently adjust their behavior accordingly. The authors find that allowing subjects to buy anonymity increases dishonest behavior.

[11] Many of the hypotheses where we refer to BT can also be generated from theories on beliefs about future reciprocation. However, we use BT for its relative simplicity in a static setting and its focus on image effects.

contribution. In our PG setting, contributing a attracts a reward of ya in the same currency, and hence $R(a, y)$ can be expressed as an increasing function of a, the contributed amount.[12]

The effect of adding PG contribution to the published information will thus depend on the reputation function, which could either be positive or negative depending on how much the subject contributed, and thus whether she wants to promote or hide it. From the start subjects might have minor reputational concern for having their name and participation information published, all the more so when a selfie is included, due to many factors like social media aversion, if the selfie is one that is deemed attractive by the subject or not, or other general privacy concerns. This means that they may state bids greater than zero even without the contribution information. Those who contributed a lot and want to signal this would decrease their bids when contribution information is included while those who want to hide low contributions would increase their bids when contribution information is included. This means that it is not possible to know the direction of the bids when contribution information is added. However, assuming that the valuations for publishing name and PG contribution are additive and not too negatively correlated, what we should expect is an increase in the variance from the addition of contribution information, which would point to the presence of a reputational term in the subject's utility function.

Secondly, at the individual level, since people want to appear prosocial and not greedy we expect a negative correlation between the contribution and the bid for publishing contribution information. Additionally, the bids with contribution information minus that without contribution information (denoted by contribution information premium, henceforth CIP), is expected to increase as PG contribution decreases. This can be thought of as the

[12] See Appendix for details.

valuation of publishing reputationally sensitive information *net of individual privacy concerns*.[13] As a consequence, we get the following hypothesis:

Hypothesis 1: a) The variance of bids increases when contribution information is included. b) There is a negative correlation between bids for publishing contribution information and PG contributions. c) CIP is decreasing with PG contribution.

2.2 The visibility of information

Our next hypothesis can be considered to be the mirror image of the previous one. We evaluate the impact of adding a selfie given that sensitive information is already publicly available. Note that, if information is published, the subjects are already identifiable since names are always included in all sets of information, however the addition of the selfie increases the visibility of the information by making it easier to identify subjects.

Turning back to the BT model, adding a selfie boils down to increasing the salience or visibility parameter (x) in the reputation function, and the effect will thus be to amplify the reputational gain or loss depending on the subject's PG contribution. For some subjects who have contributed sufficiently much in the PG with low privacy concerns, their BDM bid would be zero, which is the lowest possible bid in our design.[14] A selfie would not change the zero bid since it would only increase the reputational value of this information. However, since subjects were not aware that the decisions made in the PG could be made public, contribution decisions were made without taking into account reputational concerns and are likely to be lower than if subjects knew these would be public information. We can

[13] Hypothesis 1c would be identical to Hypothesis 1b in the case where subjects do not display a disutility for publishing name (and selfie). If that is the case, the subject would bid zero for publishing name (and selfie), and her CIP would therefore equal her bid for publishing the same information plus the PG contribution. From an empirical point of view people do value privacy and subjects indeed display a positive reservation price for publishing name (and selfie).

[14] In theory the subjects might be willing to pay to publish such information (which would imply negative BDM bids), but for practical reasons we excluded negative bids in our experimental design.

thus expect that some subjects would prefer to hide this information since it has a reputational cost to them. These subjects would make positive bids, and since the selfie will increase the visibility of their PG contribution, these bids would increase when published with a selfie. Thus, we expect that bids will be higher with a selfie than without.[15] The same mechanism that is expected to push up the average bid will also generate a larger variation in the bids when a selfie is included in the information than if not, assuming that the valuation for publishing name and PG contribution and the valuation for publishing the selfie are additive and not too negatively correlated. Additionally, the increase in bids, that is the difference in valuation between the subject's BDM bid with selfie and the bid without the selfie (which we term the selfie premium) should be higher the lower the PG contribution.

Hypothesis 2: a) A selfie will increase the bid for publishing contribution information. b) A selfie will increase the variance of bids. c) Selfie premium is decreasing with PG contribution.

2.3 Other factors

When we test the robustness of our results in regressions we also control for other factors that may affect the BDM bids. Some subjects may have privacy concerns which affect their use of social media and in turn their willingness to publish information about themselves on the web. We therefore control for factors such as how narcissistic they are (according to the Narcissistic Personality Inventory, Ames et al., 2006), how often they take selfies, how they rate the attractiveness of their selfies in the experiment and how active they are on various social media platforms. We categorize social media platforms according to whether they are visual (Facebook and Instagram) or text-based (Twitter), since the former is typically used for

[15] If we assume that some subjects are concerned about privacy, and consequently bid positive for contribution information without the selfie even after a high PG contribution, adding a selfie has the same effect as for subjects who have made a low PG contribution: the same privacy concern will lead them to increase the valuation of the information with the selfie.

the sharing of selfies to the public but not the latter. Furthermore, the BDM elicitation method can be difficult to grasp (see Cason and Plott, 2014) and lack of understanding may cause noisy behavior and thereby bias elicitations (see e.g., Andersson et al., 2016). We therefore control for cognitive reflection (see Frederick, 2005). A low score might bias BDM bids upward given that the profit-maximizing dominant strategy is to bid zero.

Additionally, we control for the standard demographic variables of age, gender, nationality and major. Aversion to publishing information on the web, and hence BDM bids, are expected to be higher for older students who are less familiar with social media, though given our student sample the majority should have had previous social media experience. While different factors may affect how males and females use social media (Correa et al., 2010), we have no ex-ante prediction regarding how BDM bids are affected by gender, major or nationality.

3. Experiment

We will here describe the general design and then detail the content of the sessions.

3.1 Design

Our experimental design is aimed at investigating valuations for the publication of various potentially sensitive information sets both within and between subjects. We therefore adopt the design strategy as summarized in Table 1. The underlying structure of each session consists of a PG, followed by three BDM rounds: BDM1, BDM2 and BDM3. BDM1 and BDM2 elicit subjects' reservation prices for the publication of various combinations of name, selfie, participation and contribution information as will be explained below. BDM3 elicits subjects' reservation prices for the publication of BDM1 and the information it contains.[16]

[16] This is done to check for evidence of more sophisticated reasoning by subjects, which is not found in the data. The analysis is detailed in the Appendix.

Apart from the contents of BDM1 and BDM2, the treatments differ in whether or not subjects take selfies before the PG and, if they do, when they are then asked to rate their selfies. In Treatment 1 (T1), subjects take a selfie, play the PG, rate the selfie, and then proceed to the BDM stages. In T2, subjects take a selfie, rate it, and then play the PG followed by the BDM stages. The order of PG and selfie rating is varied to control for the effect of having rated the selfies, though no order effect is expected.[17] In the control treatment (T3), subjects play the PG followed by the BDM stages without taking or rating selfies. This design also allows us to obtain a clean treatment effect of selfie-taking by comparing PG contributions in T3 with those from T1 and T2 combined, which is one of our exploratory questions to be discussed in section 5.

Table 1: Structure of experimental treatments

T1	**T2**	**T3/Control**
Questionnaire	Questionnaire	Questionnaire
Take selfie	Take selfie	
PG	PG	PG
Risk elicitation	Risk elicitation	Risk elicitation
BDM1 for *NS*	BDM1 for *NCS*	BDM1 for *NC*
BDM2 for *NCS*	BDM2 for *NC*	BDM2 for *N*
BDM3 for *BDM1 bid*	BDM3 for *BDM1 bid*	BDM3 for *BDM1 bid*
Post-experiment survey	Post-experiment survey	Post-experiment survey
Earnings announced	Earnings announced	Earnings announced

The letters in the BDM elicitations refer to which information set is to be published if the bid is accepted. N – name of the subject. C – contribution in PG. S – selfie.

In the PG stage, subjects are divided into pairs and given an endowment of 135 SEK (Swedish crowns) each.[18] To avoid an obvious 50-50 sharing norm, each subject can only contribute from the following amounts to a group project with the other member: 0, 15, 30, 45, 60, 75, 90, 105, 120, 135, and keep any remaining amount. The total contribution from both group members is then multiplied by 1.4 and split evenly. The PG is followed by a risk

[17] Given that subjects take a selfie, PG contribution is not affected by having rated the selfie (Wilcoxon-Mann-Whitney (WMW) test p=0.75, n=163), nor by the rating itself (Pearson correlation coefficient 0.03, p=0.70).
[18] 135 SEK is roughly equivalent to 15 USD at the time of the experiment.

elicitation task (Gneezy and Potters, 1997), where subjects are given the same endowment of 135 SEK and can invest from the above amounts in a risky project which pays three times the amount invested or zero, each with a probability of 0.5. This is done to control for risk attitude and its effect on PG contribution.

The information published, for which bids are elicited in BDM1 and BDM2, can be classified into four types: *N – Name, NC – Name and Contribution in PG, NS – Name and Selfie, and NCS – Name, Contribution in PG and Selfie.* In *N*, subjects are asked to state the minimum price they have to be paid for their name and participation information to be published on our researcher's webpage. Specifically, the webpage would display the following sentence: "[Subject's full name] took part in an experiment on decision-making." In *NC*, the published sentence states: "[Subject's full name] took part in an experiment on decision-making. He/She had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. [Subject's full name] decided to contribute [subject's PG contribution] to this group project." *NS* and *NCS* are identical to *N* and *NC* respectively, the only difference being that the selfie taken earlier is included with the corresponding published sentence.[19] In the control treatment, subjects bid first for *NC* followed by *N*, thus yielding the (within-subject) CIP without selfie. CIP with selfie is obtained in T1, where subjects first bid for *NS* and then *NCS*. In T2, subjects bid for *NCS* followed by *NC*, thus yielding the selfie premium. The order of bids in the control is reversed in T1 to allow for between-subject comparison with T2.

Finally, we summarize how we plan to conduct hypotheses tests using the experimental design in Table 2. It should be noted that some of the between-subject comparisons of the BDM elicitations can be affected by the previous tasks. For instance in

[19] In the Appendix we provide examples of information that was published on the researcher's webpage.

Hypothesis 1, comparing BDM1 in T1 vs T2 is relatively unproblematic since the subjects have been exposed to the same tasks before they do BDM1, but this is not true for the comparison of BDM1 in T3 vs T2 since T2 subjects have taken a selfie, which is not the case for T3 subjects. To provide additional evidence we therefore also (whenever it is possible) provide within-subject tests. In these tests all subjects have been exposed to the same "history" of tasks, but it can never be excluded that the effects are due to this specific history or that the order of the elicitations may matter. However, when both between-subject and within-subject comparisons point in the same direction and are significant, we can be rather confident that there is a treatment effect. This will also be tested using Fisher's method, as will be detailed further below.

Table 2: Summary of hypotheses tests in experimental design

Hypothesis	Between-subject Comparison	Within-subject Comparison
1. Contribution information	BDM1 in T1 vs T2 BDM2 in T3 vs T2	BDM1 vs BDM2 in T1 BDM2 vs BDM1 in T3 Correlations
2. Visibility (impact of selfie)	BDM1 in T3 vs T2 BDM2 in T2 vs T1	BDM2 vs BDM1 in T2 Correlation

3.2 Sessions

The experiment was conducted in a computer room at the Lund University School of Economics and Management (LUSEM) during the period 3-12 November 2015 and programmed using z-Tree (Fischbacher, 2007). Participants were recruited through e-mail from the pool of students taking courses at LUSEM and using posters displayed throughout the school. In total we ran 14 sessions with 233 subjects.[20] Each session lasted approximately 75 minutes and subjects earned 50 SEK in show-up fee. Additionally, subjects earned on

[20] One subject had difficulty understanding the instructions and was not used to taking a selfie. We have therefore excluded this observation from the data.

average 235 SEK in experimental earnings. The total hourly experimental pay was 228 SEK, which is more than this group would earn on a regular job in Sweden.

Upon arriving at the lab, subjects are randomly assigned to seats and asked to put their phone on silent and flight mode, face down on the side of the table. Instructions are read and subjects then complete a brief demographic survey followed by the Rosenberg (1965) self-esteem questionnaire.[21]

In T1 and T2, subjects are next asked to take a selfie using the camera on their mobile phone and ensure the image is saved. The only requirement for the selfie is that it contains the subject's face but no part of any other individual. The subjects who did not have a camera phone were allowed to borrow the experimenter's phone to take the selfie.[22] In T2, this is followed by the rating stage: subjects are asked to rate how attractive their selfies are and how they expect others to rate them, both on a scale from 1 to 7. In T1, the rating stage comes after the PG stage.

At the start of each of the BDM stages, subjects are informed that they have the opportunity to sell the right to publish some information about themselves, and what information would be displayed should they choose to sell this right. The information would be published on our researcher's webpage for a period of two months, starting three weeks after the experiment concludes. Subjects are told that the webpage was historically viewed by approximately 40 people per month, but that there is no guarantee that this number would stay the same after their information is published.[23] They are also informed that this information may be used for future research purposes and appear in research papers or presentations about this experiment, but apart from these the information will be used for no other purpose.

[21] Instructions can be found in the Appendix.
[22] Of the 163 students in T1 and T2, 10 did not have a camera phone.
[23] This particular outlet was chosen to fix beliefs and to retain control over the publication process. It can be noted that this publication means relatively "low exposure". Consequently, the different treatment effects on bids are probably underestimated compared to other standard modes of publication, e.g. on a Facebook profile page.

The subjects are asked to name the minimum price, between 0 and 201 SEK, at which they are willing to sell the right to publish their information. The actual price is determined individually by a random draw of the computer which can take any value between 0 and 200. If the randomly drawn price is less than the bid, no information is published and no money is earned in this stage. If the randomly drawn price is greater than or equal to the bid, the right to publish the information is sold and subjects are paid the amount as determined by the random draw. They are asked to show a photo ID at the end of the experiment, and if the selfie is sold, to e-mail the selfie to the experimenter. Contribution information and BDM1 prices, if sold, are displayed on the last screen on the subject's computer to be copied by the experimenter.

Throughout the BDM stages we emphasize that subjects have no obligation to sell the right to publish their information, and they are given instructions on how to ensure their information is never published.[24]

To familiarize subjects with the BDM procedure, we include an example in the instructions read aloud at the start of the stage and show that it is optimal for them to state their true valuation. It was also pointed out that if they do not mind that their information is published, they will maximize their pay-off by bidding 0. Prior to the actual BDM elicitation, subjects complete two questions and are given feedback on their answers to ensure they understand how the transaction works. This is followed by a simulation round where they can practice selling their information in a hypothetical transaction. While the BDM procedure is a popular method for eliciting valuation in an incentive compatible way, it has come under criticism for subjects' failure in recognizing the relevant game form (see e.g., Cason and Plott, 2014). The extensive explanation of the procedure given in the instructions, the practice questions and simulation round are aimed at addressing this criticism. Moreover, as also

[24] Subjects are informed that if they are unwilling to have any information published they should bid 201.

pointed out in Friedrichsen and Engelmann (2014), any monotonic bias in the true valuation will not affect our analysis of BDM premia or comparison across treatments or groups.

After the last BDM stage, subjects complete a second questionnaire containing a brief cognitive reflection test, social media and prosocial habits, the Big 5 Inventory, the Narcissistic Personality Inventory (NPI) (Ames et al., 2006) and control questions about if they had learned from someone about the content of the experiment.[25] Finally, total earnings are displayed. For each session, two stages are randomly chosen for payment and implementation: the first paid stage is chosen out of the PG and the following risk elicitation task, and the second paid stage is chosen out of the three BDM stages.

4. Results

Of the 233 total participants, 65% are male and 66% Swedish. 50% are majoring in Economics, and the average age is 24. Summary statistics of the key variables elicited in the experiment are presented in Table 3.

Table 3: Summary statistics

	N	Mean	SD	Min	Max
Treatment 1					
PG contribution	77	44.22	45.06	0	135
Risky investment	77	76.56	39.58	0	135
BDM1 for *NS*	77	58.95	69.62	0	201
BDM2 for *NCS*	77	68.43	76.12	0	201
Treatment 2					
PG contribution	86	43.43	46.76	0	135
Risky investment	86	78.14	39.33	0	135
BDM1 for *NCS*	86	64.63	72.19	0	201
BDM2 for *NC*	86	38.63	59.45	0	201
Treatment 3					
PG contribution	70	51.00	49.68	0	135

[25] Only 2 subjects claimed to have had some knowledge about the experiment before participating in the experiment (other than the information stated in the recruitment e-mail). The behavior of these subjects did not differ in any notable way from the other subjects.

Risky investment	70	83.57	42.08	0	135
BDM1 for *NC*	70	46.91	67.69	0	201
BDM2 for *N*	70	22.69	51.73	0	201

Our results section is structured as follows. We start with the valuation of socially sensitive information about PG contributions (H1) and then move on to the impact of visibility through the selfie (H2). We conduct two-sided non-parametric tests for significant difference within and between subjects as described in Table 2. We also conduct regression analyses to check the robustness of our results. While we expect our results to go in the direction predicted by the hypotheses above, given that we run multiple tests for some hypotheses we cannot characterize our results in a simple binary way. For hypotheses with a single test, whenever our result is in the expected direction with at least 5% significance, we can conclude that the hypothesis is confirmed. It is weakly confirmed if the result is significant at the 10% level. For hypotheses with multiple tests (H1a, H1b, H2a, H2b), we combine the p-values using Fisher's method. Given that we cannot exclude dependence in our sample, the combined p-values should thus be interpreted with care.[26] As a pre-caution we adopt stricter significance thresholds: we consider the hypothesis confirmed if the combined p-value is less than 1%, and weakly confirmed if the combined p-value is less than 5%. A summary of test results is presented in Table 4.

Table 4: Summary of test results

Hypothesis	Between-subject Comparison	Within-subject Comparison	Fisher's Method	Conclusion
H1a	+(+) (T1 vs T2) +(+)** (T3 vs T2)	+(+) (T1) +(+)*** (T3)	***	C
H1b		-(-) (*correl, NC*) -(-)** (*correl, NCS*)	**	W

[26] While there are corrections that address the dependence in samples, such as Brown's method or Kost's method, these rely on knowing the form of the covariance matrix of the underlying test statistics (Brown, 1975, Kost and McDermott, 2002).

H1c		-(-)* (*correl*)		W
H2a	+(+)* (T3 vs T2) +(+)** (T2 vs T1)	+(+)**	***	C
H2b	+(+) (T3 vs T2) +(+)*** (T2 vs T1)	+(+)***	***	C
H2c		-(-)** (*correl*)		C

+/- indicates direction of two-sided test result or correlation, expected direction in parentheses. *** p<0.01, ** p<0.05, * p<0.1. "C" indicates the hypothesis is confirmed and "W" weakly confirmed.

4.1 Social-signaling through PG contribution

As seen in Table 3 above, the standard deviation of BDM bids in T1 is higher for *NCS* (76) than for *NS* (70). Similarly, in T3, standard deviation for BDM bids is higher for *NC* (68) than *N* (52). The higher variance points to the presence of reputational concerns in the subject's utility function when contribution information is published alongside her name. As summarized in Table 4, however, the difference is only significant in a Levene test in T3 (p=0.00) and not in T1 (p=0.14). When we turn to between-subject tests, we obtain similar results. The difference in BDM1 standard deviation, which corresponds to *NCS* in T2 (72) and *NS* in T1 (70), is not statistically significant (p=0.25). The difference in BDM2 standard deviation, which corresponds to *NC* in T2 (59) and *N* in T3 (52), is statistically significant (p=0.05). Despite the fact that the differences are not consistently significant, in particular only without a selfie, an application of Fisher's method yields a combined p-value of 0.001, overall confirming Hypothesis 1a regarding increased heterogeneity of bids with contribution information.

The data also provides support for Hypothesis 1b in that higher PG contributions are associated with lower bids for the publication of contribution information, significantly so when a selfie accompanies it. The Pearson coefficients of correlation between the variables are -0.17 for *NCS* (p=0.03, n=163) and -0.09 for *NC* (p=0.25, n=156). The combined p-value under Fisher's method is 0.041, weakly confirming Hypothesis 1b. We also run linear

regressions with control variables which may be expected to influence the subject's valuation for the right to publish her name and selfie.[27] As columns (1-2) of Table 5 show, an increase in PG contribution does result in a higher willingness to publish that information as indicated by the negative effect on bid, though it is only significant when a selfie is included.[28] It is also worth noting that subjects who actively use Facebook and Instagram, which are visual-based social media platforms often used for sharing photos, have a higher willingness to publish their information on the web, while frequent users of Twitter, which is text-based, show a lower willingness to publish the same information. Swedish subjects also appear to be more willing to publish their selfies with contribution information than non-Swedish subjects. Consistent with our expectation, low cognitive ability biases bids upwards.

Table 5: OLS regressions of *NC* and *NCS* bids and CIP

	(1) *NC* T2+T3	(2) *NCS* T1+T2	(3) CIP T1+T3
PG contribution	-0.13	-0.29**	-0.24**
	(0.11)	(0.12)	(0.11)
T1			-24.29**
			(10.72)
PG contribution * T1			0.18
			(0.16)
T2	-5.35	1.90	
	(10.45)	(11.39)	
NPI	8.33	-14.31	-0.68
	(26.72)	(30.99)	(21.54)
Visual SM	-8.04*	-14.12***	-0.65
	(4.31)	(5.06)	(3.40)
Text SM	4.70	20.27***	4.18
	(7.30)	(7.52)	(5.88)
Selfie frequency	-6.38	-4.35	-0.86
	(5.29)	(5.56)	(3.50)
Rating		-4.35	
		(4.44)	
CRT	-10.64**	-15.12**	-2.24
	(5.37)	(5.88)	(3.54)
Age	0.15	0.05	-0.66

[27] All post regression estimates of Variance Inflation Factors (VIF) do not exceed 1.26, which is less than the rule of thumb threshold value of 10 thus showing no evidence of multicollinearity (Chatterjee and Hadi, 2012).
[28] The negative effect of PG contribution on the bid is robust to tobit specification (see Appendix).

	(1.27)	(1.40)	(1.29)
Male	-18.19	-2.67	-9.18
	(11.57)	(12.92)	(8.41)
Swedish	-12.28	-24.78**	-3.27
	(11.20)	(11.65)	(8.23)
Econ	8.36	4.08	-7.41
	(10.31)	(11.38)	(7.66)
Constant	129.51***	192.52***	67.18
	(45.93)	(53.68)	(41.56)
Observations	156	163	147
Adjusted R-squared	0.03	0.12	0.01

"*NPI*" is the subject's score in the Narcissistic Personality Inventory (NPI-16) (Ames et al., 2006), ranging from 0-1. "*Visual SM*" is the sum of scores from the responses to questions about daily usage of Facebook and Instagram, where: 1 is "I do not have an account here", 2 is "Less than 30 minutes", 3 is "30 minutes - 1 hour" and 4 is "More than 1 hour". "*Text SM*" is the corresponding score for daily usage of Twitter. "*Selfie frequency*" is the subject's frequency of selfie-taking, where: 1 is "Never", 2 is "Less than 1 time per month", 3 is "1-3 times per month", 4 is "1-6 times per week", and 5 is "Once or more per day". "*Rating*" is the subject's rating of their own selfie on a scale from 1-7, where 1 is "very unattractive" and 7 is "very attractive". "*CRT*" is the number of correct responses to three Cognitive Reflection Test questions. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

As predicted in Hypothesis 1c, CIP also decreases when PG contribution increases. The Pearson correlation coefficient is -0.15 (p=0.08, n=147), and this negative correlation is also confirmed by the linear regression in column (3) of Table 5. A 1 SEK increase in PG contribution reduces the CIP by around 0.24 SEK. It is worth noting that when the subject has taken a selfie and that selfie is published along with the PG contribution, the CIP is also lower by approximately 24 SEK, ceteris paribus. This point will be explored further in section 5. Overall, our results provide partial support to Hypothesis 1: the bid premium resulting from publishing contribution information, and the bid itself (with a selfie), are negatively correlated with PG contribution, while the variance of bids increases with the addition of contribution information.

4.2 Increased visibility

Table 3 also shows that the treatment effect of publishing a selfie along with name and contribution information is to increase the subject's bid. In T3, the average bid for BDM1 is 47 while adding the selfie in T2 raises it to 65 (WMW test p=0.06, n=156). Similarly, in T2

the average bid for BDM2 is 39, while the corresponding average bid with the selfie in T1 is 68 (p=0.01, n=163). This difference is also seen within T2, where removing the selfie in BDM2 lowers the average bid from 65 to 39 (p=0.02). As summarized in Table 4, overall the results confirm Hypothesis 2a concerning the negative effect of increased visibility on subjects' willingness to publish their contribution information, with a combined p-value of 0.001. This is also evident in the linear regressions shown in Table 6. In columns (1-2), the coefficients of "Selfie included" indicate that adding a selfie raises the bid by approximately 20 SEK.[29] We note again that active users of Facebook and Instagram, visual-based social media platforms, are more willing to publish their information while the opposite is the case for Twitter. Swedish subjects also have a marginally higher willingness to publish their information. Low cognitive ability is again associated with an upward bias in bids.

We should also according to Hypothesis 2b expect a higher variance when a selfie is added to the publication of contribution information, and as Table 3 shows this is again the case. The standard deviation of BDM1 for *NC* in T3 is 68, which increases to 72 for *NCS* in T2, though a Levene test shows that this difference is not significant (p=0.15). For BDM2, the standard deviation for *NC* in T2 is 59 which increases to 76 for *NCS* when a selfie is included in T1. This difference is significant (p=0.00). Similarly, within T2 removing the selfie decreases the standard deviation from 72 in BDM1 to 59 in BDM2 (p=0.00). Applying Fisher's method yields a highly significant combined p-value (0.000). The higher variance when a selfie is added points to the stronger signaling motive for subjects, causing those who would like to prevent the publication of their information to bid higher while those who are not concerned bid lower. Given that the lower bound for bids is zero, the effect is stronger for the former group of subjects, which naturally translates to a higher average bid as discussed in the previous paragraph.

[29] The positive effect of selfie publication on the bid is robust to tobit specification (see Appendix).

Looking next at the selfie premium we find results that confirm Hypothesis 2c. In T2, as PG contribution increases, subjects attach lower premium to increased visibility. The Pearson correlation coefficient is -0.25 (p=0.02, n=86). This negative relationship is also supported by linear regression results in column (3) of Table 6: the coefficient for PG contribution is negative and significant at the 5% level. Overall, our results confirm that publishing a selfie increases bids and this increase is driven by low PG contribution.

Table 6: OLS regression results

	(1) BDM1 T2+T3	(2) BDM2 T1+T2	(3) Selfie premium T2
PG contribution	-0.29**	-0.13	-0.28**
	(0.12)	(0.12)	(0.14)
Selfie included	19.98*	24.36**	
	(11.30)	(10.80)	
NPI	-18.91	8.29	-34.46
	(28.89)	(29.37)	(33.52)
Visual SM	-12.51***	-9.77**	-5.88
	(4.66)	(4.80)	(5.51)
Text SM	12.43	12.86*	10.77
	(7.90)	(7.13)	(8.25)
Selfie frequency	-6.39	-4.24	-1.58
	(5.72)	(5.27)	(7.23)
Rating		-1.68	-3.51
		(4.21)	(5.16)
CRT	-10.35*	-14.50**	-0.61
	(5.80)	(5.57)	(7.32)
Age	-0.61	0.76	-0.65
	(1.37)	(1.33)	(1.37)
Male	-13.98	-6.02	5.20
	(12.51)	(12.24)	(15.14)
Swedish	-18.01	-20.38*	-5.65
	(12.11)	(11.03)	(13.11)
Econ	9.84	3.65	5.74
	(11.14)	(10.78)	(12.74)
Constant	174.33***	113.17**	95.68
	(49.66)	(52.73)	(58.30)
Observations	156	163	86
Adjusted R-squared	0.09	0.11	0.03

"*Selfie included*" is a dummy variable equal to 1 for bids for *NS* or *NCS*, or 0 for bids for *N* or *NC*. In column (1), a "*Selfie included*" value of 1(0) corresponds to being in T2(T3). In column (2), a value of 1(0) corresponds to T1(T2). "*NPI*" is the subject's score in the Narcissistic Personality Inventory (NPI-16) (Ames et al., 2006), ranging from 0-1. "*Visual SM*" is the sum of scores from the responses to questions about daily usage of

Facebook and Instagram, where: 1 is "I do not have an account here", 2 is "Less than 30 minutes", 3 is "30 minutes - 1 hour" and 4 is "More than 1 hour". "*Text SM*" is the corresponding score for daily usage of Twitter. "*Selfie frequency*" is the subject's frequency of selfie-taking, where: 1 is "Never", 2 is "Less than 1 time per month", 3 is "1-3 times per month", 4 is "1-6 times per week", and 5 is "Once or more per day". "*Rating*" is the subject's rating of their own selfie on a scale from 1-7, where 1 is "very unattractive" and 7 is "very attractive". "*CRT*" is the number of correct responses to three Cognitive Reflection Test questions. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

5. Exploratory Questions

In this section we will explore further some of the mechanisms behind the subjects' valuations of their signals. More specifically, we are interested in how subjects' social image concern is affected by the inclusion of a selfie in the signal. Furthermore, we will explore whether taking a selfie affects subjects' inclination to cooperate. In contrast to our previous analysis, here we will mainly motivate our questions by previous empirical research and not by a theoretical model.

5.1 Crowding-out of social image concerns

When we compare the CIP demanded by subjects in T1 (with a selfie) and in T3 (without a selfie), one prediction would be that the PG contribution information would have a larger effect on subjects' willingness to publish when it is also more visible with the selfie. However, if subjects already demand a high price for publishing their name and selfie, for example if they are concerned about their physical appearance, the addition of PG contribution may not lead to a substantial increase in bids.

Indeed, and analogous to the Narcissus myth, concerns for physical appearance have been found to dominate other concerns, as they reflect a narcissistic personality trait (Davis et al., 2001, Vazire et al., 2008).[30] This means that at the moment subjects make their bids for publishing PG contribution, having their selfies also published may accentuate

[30] Insofar as one believes that mythology provides insights to our psyche, it can be noted that Narcissus fell in love with his own image to the extent that he committed suicide. His obsession with his own image entirely crowded out other concerns.

concerns about physical appearance which can push aside potential reputational concerns arising from the information about previous contribution in the PG. CIP with a selfie would thus be less than that without the selfie. If such crowding-out effect is strong enough one should also expect that the variance of the CIP with a selfie will be lower than the variance without a selfie, as subjects become less concerned about hiding or publishing their contribution resulting in lower heterogeneity in CIP.[31]

5.1.1. Results on crowding-out

From our results, we find that the average CIP in T1 with the selfie is 9.48, which is lower than 24.23 in T3 without the selfie. This difference is marginally significant (WMW test p=0.06, n=147) and thus consistent with the crowding-out explanation. When we consider the variance, a stronger result in the expected direction is obtained: the standard deviation of CIP with the selfie is 36, compared to 51 without the selfie. A Levene test shows that this difference is also significant (p=0.00). When contribution information is published along with a selfie, subjects become less concerned about hiding or publicizing their contribution and consequently there is less heterogeneity in CIP. These results are also confirmed in the OLS regression of CIP in column (3) of Table 5, where the treatment effect of including a selfie in T1 is a significant decrease of the CIP by 24 SEK, thus indicating that social image concerns are crowded out by concerns about physical appearance.[32]

More generally, adding contribution information does not change bids when a selfie is included. BDM1 and BDM2 are not significantly different in T1 (59 vs 68, p=0.60). In T3, however, average bid for *NC* with contribution information is 47, which is higher than that for *N* at 23 (p=0.04). Another evidence of the crowding-out effect is found in the

[31] $Var(X+Y) < Var(X)$ as long as $2Cov(X,Y) + Var(Y) < 0$, that is, $Cov(X,Y) < 0$ and its absolute value is sufficiently high. In our setting, X and Y represent the CIP and the valuation of the selfie respectively. The above condition is therefore satisfied given a strong crowding-out effect, as a higher concern for physical appearance is associated with a lower concern for social image, as measured by the CIP demanded.

[32] The results are robust to excluding bids at the maximum value (see Appendix).

correlation of CIP with PG contribution. In T1, this value is -0.05 (p=0.66), which is insignificant. In T3 when the selfie is removed, the correlation is much stronger and significant at -0.24 (p=0.046). Hence PG contribution affects CIP only without the selfie. Taken together with the evidence for Hypotheses 1a and 1c, that the standard deviations of bids with and without contribution information are only statistically different without a selfie and that the CIP is lower when a selfie is included, this provides further evidence that the inclusion of the selfie dampens the CIP.

One might argue that the effect of selfie on CIP is merely due to the order effect: in T1 PG contribution information is added in BDM2, while in T3 it is removed. While T2 does not provide within-subject data on CIP to confirm or disconfirm any order effect, it does provide a way to show that the more general result in the previous paragraph holds: that while adding contribution information increases bids, this increase is lower and the significance disappears when the published information is accompanied by a selfie. We do this by comparing the BDM bids between treatments, with and without selfies. Average BDM1 in T1 for *NS* is 59, but adding PG contribution information in T2 only results in a slight increase to 65 for *NCS* (p=0.86, n=163). The average BDM2 in T3 for *N* is 23 and adding contribution information in T2 raises the average BDM2 bid to 39 for *NC*. The difference is significant (p=0.02, n=156). Overall, while we cannot completely discount order effect, we have provided further evidence why such an effect unlikely explains our crowding-out result.

5.2. Selfie-taking and cooperation

The impact of taking a selfie on cooperation is not obvious a priori. Research based on priming, self-signaling and behavioral addiction suggests opposing mechanisms that may be triggered by the taking of a selfie.

Evidence suggests that subtle observation cues, in particular a picture of "watching eyes", trigger people to instinctively take reputation into account when making choices, resulting in increased prosociality (Haley and Fessler, 2005, Bateson et al., 2006, Ernest-Jones et al., 2011, and Ekström, 2012). One can thus expect that in a selfie, when the subject is directly facing an image of herself for a brief moment, she may also react to the eye cues in a similar way.

Taking a selfie is also a way to capture an image of oneself at the present moment, to be preserved for future viewing either by oneself or to show to others. This can thus serve as a prime for the subject to present the best version of herself, leading to increased prosociality in the immediate future. Related to this, taking a selfie also increases the salience of the present moment. If subjects anticipate that the memory of this moment, and hence the subsequent action immediately following it, would last for longer, self-signaling motive would thus also lead to increased prosociality (Bénabou and Tirole, 2006, p. 1657).[33]

It is important to take into account that selfies are usually taken for the purpose of sharing by uploading to a social media website, where the emphasis on self-presentation may drive individuals to focus on their physical appearance. Consequently, selfie-taking has been associated with narcissistic personality traits and a self-centered mindset (Sorokowski et al., 2015, Weiser, 2015, Fox and Rooney, 2015) which can trigger behavior that seeks benefits for the self at a cost to others (Campbell et al., 2005). This concern about self-presentation and physical appearance may well crowd out other concerns, including concern for others, as described in the previous section. Altogether, these findings suggest that taking a selfie has no obvious effect on PG contribution.

[33] Van der Weele and Von Siemens (2014) provide a direct test of this by asking subjects to wear a bracelet as a reminder of their donation in the experiment. No self-signaling effect is found in this setting. Other evidence of self-signaling is seen in situations where individuals avoid full information, under which their actions would unambiguously signal their type. See, e.g., Dana et al. (2006), Dana et al. (2007) and Grossman and Van der Weele (2016). In Tonin and Vlassopoulos (2013), subjects opt out from a positive donation, indicating that the decision to give was motivated by self-signaling – which, once satiated, allows the individual to reverse her decision.

On the other hand, frequent selfie-taking can also be considered to be a type of behavioral addiction. According to Grant et al. (2010), "addicts" can be characterized by their sensation-seeking behavior, to the extent that they succumb to the temptation to perform acts that are harmful to themselves or others.[34] Several behavioral addictions have been shown to share the same emotional and neural processes as substance abuse (ibid.).[35] Given this, it is likely that addicted people are more triggered by a stimulus related to the addiction than non-addicted people and also that this stimulus crowds out other concerns more in the former group. Hence, by the same logic as seeing a slot machine makes a compulsive gambler less concerned about other things than the immediate gratification from placing a gamble, in the case of selfie-taking, asking addicts to take a selfie in the experiment can serve as a stimulant that triggers self-interest, crowding out other social or reputational concerns.

The addiction mechanism above suggests that for frequent selfie-takers, the self-centric aspect of selfie-taking (Weiser, 2015, Fox and Rooney, 2015) will be magnified while other aspects will become routine and have smaller effects. They will arguably become desensitized to the self-image motive arising from subtle eye cues or the prime to present the best version of themselves. Consequently, addicts who are exposed to the selfie treatment are expected to display less cooperative behavior in the subsequent PG compared to addicts who do not experience the stimulus.

5.2.1. Results on selfie-taking and cooperation

We present the average PG contribution across treatment groups, for various frequencies of selfie-taking, in Table 7. The mean contribution for the whole group (i.e., Treatments 1 and 2)

[34]We refer again to the mythological example of Narcissus. A long list of reported injuries and even deaths in connection with selfie-taking especially among young people breathe life into this old myth (for a list and media sources see http://en.wikipedia.org/wiki/List_of_selfie-related_injuries_and_deaths, accessed 21-April-2016).
[35] In the last version of the Diagnostic and Statistical Manual of Mental Disorders (DSM 5) (2013) accepted by the American Psychiatric Association, compulsive gambling received official status as a behavioral addiction disorder with a specific diagnosis code, while several other compulsive behaviors received a more general diagnosis ("Behavioral Addiction, Not Otherwise Specified").

who took a selfie before the PG was 44 and it was 51 for the group (T3) who did not, which may suggest that taking a selfie has a negative impact on cooperation. There is however no statistically significant difference between the two samples in a WMW test (p=0.32, n=233), which means that we cannot reject that the positive and negative effects of selfie-taking roughly counteract each other. When we look at the frequent selfie producers who according to the addiction mechanism should be affected by taking a selfie, we do in fact find substantial differences.[36] Among the subjects who take a selfie at least once a week the corresponding means are 32 and 62, respectively. This difference is statistically significant (p=0.01, n=55), which supports the behavioral addiction mechanism. Similarly, in the group who take selfies at least monthly, taking a selfie in the experiment is followed by a lower mean PG contribution of 34 compared to 53 without the selfie (p=0.02, n=108). Note the surprisingly large effects among the weekly and monthly selfie-takers, taking a selfie reduces PG contributions by 48% and 37% respectively. Moreover, this result likely underestimates the future effect of selfie-taking in the population, given the popularity of selfies among the younger generation who take selfies more often than our sample group.[37]

Table 7: Average PG contribution across treatment groups

	Selfie	No selfie
All	43.80 (163)	51.00 (70)
Take selfies at least weekly	31.92 (39)	61.88 (16)
Take selfies at least monthly	33.65 (78)	53.00 (30)

"Selfie" refers to T1 and T2, "No selfie" refers to T3. Number of observations in parentheses.

To investigate if these results are robust if we take into account potential confounds, we run linear regressions where we have included several control variables, which

[36] The proportions of frequent selfie-takers in the selfie-taking group (T1 and T2) and the control group (T3) are not significantly different. Weekly selfie-takers make up 24% of the treatment group and 23% of the control group (χ^2-test, p=0.86), while monthly selfie-takers make up 48% of the treatment group and 43% of the control group (p=0.48).

[37] In our sample where age ranges from 19 to 51, the proportion of subjects who take selfies at least once a month is 46%. According to Ofcom (2015), the proportion of monthly selfie-takers increases as we look at younger generations: 9% for age group 45-54, 24% for 35-44, 33% for 25-34 and 55% for 16-24.

include demographic variables as well as the amount invested in the risk elicitation task as a control for risk attitude.[38] In the unrestricted sample (column 1 of Table 8), taking a selfie has no significant effect. However, for those who take selfies at least once a week (column 2) or even once a month (column 3), taking a selfie significantly reduces PG contributions.[39][40]

Table 8: OLS regressions of PG contribution

	(1) PG contribution	(2) PG contribution	(3) PG contribution
Take selfie	-6.25	-34.99**	-18.22**
	(6.63)	(13.62)	(8.82)
Risk investment	0.33***	0.24*	0.29**
	(0.08)	(0.14)	(0.11)
Age	1.20	0.17	-0.35
	(0.78)	(2.29)	(1.51)
Male	-11.14*	2.47	-5.87
	(6.70)	(12.13)	(8.53)
Swedish	-11.42*	6.76	-11.22
	(6.49)	(12.69)	(8.43)
Econ	-3.11	-3.45	2.66
	(6.11)	(11.55)	(7.85)
Constant	11.54	38.70	47.22
	(21.61)	(54.13)	(37.30)
Observations	233	55	108
Adjusted R-squared	0.07	0.07	0.06

Column (1): the whole sample, column (2): subjects who take selfies at least weekly, and column (3): subjects who take selfies at least monthly. "*Take selfie*" is a dummy variable equal to 1 for subjects in T1 or T2. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

6. Concluding Remarks

In this paper we design a framed field experiment to study if recent economic theory can predict social-signaling behavior in the new environment offered by social media. Our design

[38] The results are robust to ordered logit specification (see Appendix).
[39] Comparing frequent selfie-takers and the remaining population along other characteristics, they tend to be younger, have higher self-esteem, more active on social media and rate their selfies higher. Age is already controlled for. However controlling for any of the other variables does not change the qualitative effect of selfie-taking on cooperation. Results are provided in the Appendix.
[40] We are primarily interested in whether taking a selfie lowers PG contribution for frequent selfie-takers, which is why we have performed regressions on subsamples. A regression with interaction terms instead tests if the effect of taking a selfie differs between frequent and non-frequent selfie-takers.

is novel in that it combines field aspects such as the large freedom individuals have to choose what to share in social media in retrospect (that is, after they have taken certain actions) and real publication of information about subjects on the internet with incentivized decisions under laboratory control. Previous studies on e.g. audience effects are based on between-subject treatment comparisons of behavior under varying degrees of anonymity, which are determined exogenously for subjects before actions are taken. In our sequential design, subjects play the PG, and are then surprised with multiple rounds of BDM elicitations to ex-post reveal their willingness to publish their name with various sets of information about their PG contribution or selfie. We believe that this difference is important not only because the sequential design more closely captures modern social media interaction, but also because it is more likely to create dissonance within the subjects, which is expected to affect the subjects' valuation of the information they share with others.

In the experiment we manipulate the information subjects can share concerning socially sensitive acts (PG contributions) and visibility (the selfie), which according to theory are crucial ingredients for creating social image. We find that the price demanded by subjects for "confessing" their PG contribution increases the more they free-ride. Although the direction of this effect is consistent with predictions, the effect is (somewhat surprisingly) not consistently statistically significant. The results concerning the hypothesized effect of increased visibility are statistically strong and consistent with theory in all parts. Thus, increased visibility through the publication of the selfie also makes subjects less willing to publish their information, as indicated by higher BDM bids. Furthermore, the premium a subject demands to publish her selfie is negatively correlated with the subject's degree of cooperation. We are also able to confirm less obvious theoretical predictions about increases in the variance of valuations due to the addition of socially sensitive information (i.e., PG contributions) or increased visibility (i.e., the selfie) pointing to the heterogeneous strength of

reputational concerns among subjects. The overall conclusion from these results is that theory about social image concerns can indeed guide our understanding of how subjects value the information they signal in an environment designed to reflect social media interaction. Furthermore, our study is the first to establish the extent of the chilling effect in the lab and these findings provide new empirical evidence that people are prepared to take costly actions to "filter" sensitive behavioral information about themselves (in retrospect) before it is published on the web. One obvious implication of this is that the virtual "reality" we get about other people is most likely skewed in a "softened" direction.

In light of recent technological developments which have made tracking and information dissemination increasingly cheap, the conformity arising from the desire to maintain social image may potentially have further consequences. Aggregate behavior becomes less informative about individuals' true preferences, which creates a problem for information aggregation (Jann and Schottmüller, 2016) and motivating new research into the optimal level of privacy in a fast-changing society (Ali and Bénabou, 2016).

We also explore some interesting empirically open questions where theory does not provide any clear predictions. One finding is that concerns about physical appearance (as reflected by the selfie) appear to crowd out reputational concerns for cooperative behavior, as evidenced by the lower average premium and lower variance of the premium for PG contribution information when published with a selfie. This indicates that in people's minds different dimensions of their social image compete which determine how concerned they are that certain pieces of information reach others. An interpretation of this finding is that our thinking about how we look may make us less concerned about how we behave. This may have implications for contexts in which socially sensitive actions are linked to visible physical appearance. For example, a charity may try to increase donation by publishing the name and photo of a donor in their newsletter. However, this may result in the donor being more

concerned about her physical appearance than the donation itself. If this effect is large enough, the addition of the photo may cancel out any increase in donation that adding only name can bring.

Our second exploratory question concerns the effect of selfie-taking on cooperative behavior. We find that frequent selfie-taking is an activity which may be not completely harmless. There is a strong negative impact on cooperation for frequent selfie-takers, although not for other subjects. Hence, for the majority this popular activity is merely a modern way of communicating personal visual images that saves text and has no consequence on cooperative behavior. At the same time, for the minority who take selfies often this activity can lead to uncooperativeness. This suggests the possibility of an addiction mechanism affecting frequent selfie-takers but not others. While our result in this respect is surprisingly strong we want to stress the exploratory nature of this question and that this finding needs to be complemented by results from additional studies (possibly using other subject pools and designs) before bold conclusions are drawn. One important issue for future research is how selfie-taking affects cooperative behavior over time. Our study demonstrates an effect on cooperation approximately 15 minutes after the selfie is taken. Hence, it is possible that the taking of a selfie only has an effect for a short period of time on the "addicted" selfie-takers, and that they are just as cooperative as other people as long as they are not "disturbed" by the selfie activity.

References

Acquisti, A., & Grossklags, J. (2005). Privacy and rationality in individual decision making. *IEEE Security & Privacy, 3*(1), 26-33.

Acquisti, A., John, L. K., & Loewenstein, G. (2013). What is privacy worth? *Journal of Legal Studies, 42*(2), 249-274.

Ali, S. N., & Bénabou, R. (2016). Image versus information: changing societal norms and optimal privacy. *NBER Working Paper No. 22203*.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.).

Ames, D. R., Rose, P., & Anderson, C. P. (2006). The NPI-16 as a short measure of narcissism. *Journal of Research in Personality, 40*(4), 440-450.
Andersson, O., Holm, H. J., Tyran, J.-R., & Wengström, E. (2016). Risk aversion relates to cognitive ability: preference or noise? *Journal of the European Economic Association, 14*(5), 1129-1154.
Andreoni, J., & Bernheim, B. D. (2009). Social image and the 50–50 norm: a theoretical and experimental analysis of audience effects. *Econometrica, 77*(5), 1607-1636.
Andreoni, J., & Petrie, R. (2004). Public goods experiments without confidentiality: a glimpse into fund-raising. *Journal of Public Economics, 88*(7), 1605-1623.
Bateson, M., Nettle, D., & Roberts, G. (2006). Cues of being watched enhance cooperation in a real-world setting. *Biology Letters, 2*(3), 412-414.
Bénabou, R., & Tirole, J. (2006). Incentives and prosocial behavior. *The American Economic Review, 96*(5), 1652-1678.
Benndorf, V., & Normann, H.-T. (2014). The willingness to sell personal data. *DICE Discussion Paper 143*.
Beresford, A. R., Kübler, D., & Preibusch, S. (2012). Unwillingness to pay for privacy: a field experiment. *Economics Letters, 117*(1), 25-27.
Bernheim, D. B. (1994). A theory of conformity. *Journal of Political Economy, 102*(5), 841-877.
Bohnet, I., & Frey, B. S. (1999). The sound of silence in prisoner's dilemma and dictator games. *Journal of Economic Behavior & Organization, 38*(1), 43-57.
Brown, M. B. (1975). 400: a method for combining non-independent, one-sided tests of significance. *Biometrics, 31*(4), 987-992.
Campbell, W. K., Busch, C. P., Brunell, A. B., & Shelton, J. (2005). Understanding the social costs of narcissism: the case of the tragedy of the commons. *Personality and Social Psychology Bulletin, 31*(10), 1358-1368.
Casal, S., & Mittone, L. (2016). Social esteem versus social stigma: the role of anonymity in an income reporting game. *Journal of Economic Behavior & Organization, 124*, 55-66.
Cason, T. N., & Plott, C. R. (2014). Misconceptions and game form recognition: challenges to theories of revealed preference and framing. *Journal of Political Economy, 122*(6), 1235-1270.
Chatterjee, S., & Hadi, A. S. (2012). *Regression Analysis by Example* (5th ed.).
Correa, T., Hinsley, A. W., & Gil de Zúñiga, H. (2010). Who interacts on the Web?: The intersection of users' personality and social media use. *Computers in Human Behavior, 26*(2), 247-253.
Dana, J., Cain, D. M., & Dawes, R. M. (2006). What you don't know won't hurt me: costly (but quiet) exit in dictator games. *Organizational Behavior and Human Decision Processes, 100*(2), 193-201.
Dana, J., Weber, R. A., & Kuang, J. X. (2007). Exploiting moral wiggle room: experiments demonstrating an illusory preference for fairness. *Economic Theory, 33*(1), 67-80.
Davis, C., Dionne, M., & Shuster, B. (2001). Physical and psychological correlates of appearance orientation. *Personality and Individual Differences, 30*(1), 21-30.
Ekström, M. (2012). Do watching eyes affect charitable giving? Evidence from a field experiment. *Experimental Economics, 15*(3), 530-546.
Ernest-Jones, M., Nettle, D., & Bateson, M. (2011). Effects of eye images on everyday cooperative behavior: a field experiment. *Evolution and Human Behavior, 32*(3), 172-178.
Festinger, L. (1957/1962). *A Theory of Cognitive Dissonance.* Stanford University Press.

Fischbacher, U. (2007). z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics, 10*(2), 171-178.
Fox, J., & Rooney, M. C. (2015). The Dark Triad and trait self-objectification as predictors of men's use and self-presentation behaviors on social networking sites. *Personality and Individual Differences, 76*, 161-165.
Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives, 19*(4), 25-42.
Frey, B. S., & Bohnet, I. (1997). Identification in democratic society. *The Journal of Socio-Economics, 26*(1), 25-38.
Friedrichsen, J., & Engelmann, D. (2014). Who cares for social image. *Working Paper*.
Gneezy, U., & Potters, J. (1997). An experiment on risk taking and evaluation periods. *The Quarterly Journal of Economics, 112*(2), 631-645.
Grant, J. E., Potenza, M. N., Weinstein, A., & Gorelick, D. A. (2010). Introduction to behavioral addictions. *The American Journal of Drug and Alcohol Abuse, 36*(5), 233-241.
Grossman, Z., & Van der Weele, J. J. (2016). Self-image and willful ignorance in social decisions. *Journal of the European Economic Association, forthcoming*.
Haley, K. J., & Fessler, D. M. (2005). Nobody's watching?: Subtle cues affect generosity in an anonymous economic game. *Evolution and Human Behavior, 26*(3), 245-256.
Higgins, E. T. (1987). Self-discrepancy: a theory relating self and affect. *Psychological Review, 94*(3), 319-340.
Hoffman, E., McCabe, K., & Smith, V. L. (1996). Social distance and other-regarding behavior in dictator games. *The American Economic Review, 86*(3), 653-660.
Jann, O., & Schottmüller, C. (2016). An informational theory of privacy. *TILEC Discussion Paper 2016-030*.
Kost, J. T., & McDermott, M. P. (2002). Combining dependent P-values. *Statistics & Probability Letters, 60*(2), 183-190.
Marder, B., Joinson, A., Shankar, A., & Houghton, D. (2016). The extended 'chilling' effect of Facebook: the cold reality of ubiquitous social networking. *Computers in Human Behavior, 60*, 582-592.
Marwick, A. E., & Boyd, D. (2011). I tweet honestly, I tweet passionately: Twitter users, context collapse, and the imagined audience. *New Media & Society, 131*(1), 114-133.
Ofcom. (2015). *The Communications Market Report.*
Pew Research Center. (2016). *Social Media and the Workplace.*
Qiu, L., Lu, J., Yang, S., Qu, W., & Zhu, T. (2015). What does your selfie say about you? *Computers in Human Behavior, 52*, 443-449.
Rege, M., & Telle, K. (2004). The impact of social approval and framing on cooperation in public good situations. *Journal of Public Economics, 88*(7-8), 1625-1644.
Rosenberg, M. (1965). *Society and the Adolescent Self-Image.* Princeton University Press.
Schudy, S., & Utikal, V. (2015). 'You must not know about me' - on the willingness to share personal data. *Munich Discussion Paper 2015-15*.
Senft, T. M., & Baym, N. K. (2015). What does the selfie say? Investigating a global phenomenon. *International Journal of Communication, 9*, 1588-1606.
Sorokowski, P., Sorokowska, A., Oleszkiewicz, A., Frackowiak, T., Huk, A., & Pisanski, K. (2015). Selfie posting behaviors are associated with narcissism among men. *Personality and Individual Differences, 85*, 123-127.
Teyssier, S., Etilé, F., & Combris, P. (2015). Social- and self-image concerns in fair-trade consumption. *European Review of Agricultural Economics, 42*(4), 579-606.
Tonin, M., & Vlassopoulos, M. (2013). Experimental evidence of self-image concerns as motivation for giving. *Journal of Economic Behavior & Organization, 90*, 19-27.

Van der Weele, J. J., & Von Siemens, F. (2014). Bracelets of pride and guilt? An experimental test of self-signaling in charitable giving. *CESifo Working Paper Series 4674*.

Vazire, S., Naumann, L. P., Rentfrow, P. J., & Gosling, S. D. (2008). Portrait of a narcissist: manifestations of narcissism in physical appearance. *Journal of Research in Personality, 42*(6), 1439-1447.

Weiser, E. B. (2015). #Me: narcissism and its facets as predictors of selfie-posting frequency. *Personality and Individual Differences, 86*, 477-481.

Appendix

A1. Theoretical Predictions

A1.1 Social-signaling through PG contribution

In the baseline scenario, *N*, we elicit subjects' reservation prices for publishing their name and the fact that they participated in an economic experiment. BDM bids for *N* therefore reflect their disutility of publishing their name and participation information, which could be due to factors such as privacy concerns. Let this bid, and hence disutility, be b_N.

We next add information about their PG contribution to study how subjects' valuation for the publication changes when such socially sensitive information is made public. BDM bids for *NC* thus reflect both the disutility of publishing name and participation information, b_N, but also any disutility in reputational loss arising from the publication of the PG contribution, b_C, which has a non-trivial value according to theory on social reputation as will be explained below. For simplicity, we have assumed these are additive: $b_{NC} = b_N + b_C$.

To compare bids for N and NC, note that

$$Var(b_{NC}) = Var(b_N + b_C) = Var(b_N) + Var(b_C) + 2Cov(b_N, b_C) > Var(b_N)$$

as long as b_N and b_C are not too negatively correlated. We have no reason to expect negative correlation between privacy concern for publishing name and participation and publishing PG contribution, if anything they should be positively correlated. Hence, given that subjects are heterogeneous in their reputational concerns, we have

Hypothesis 1a: The variance of bids increases when contribution information is included.

To evaluate b_C, the reputational loss from publishing PG contribution, first recall the BT model where

$$U(a, y) = (v_a + v_y y)a - C(a) + R(a, y)$$

$$= (v_a + v_y y)a - \frac{ka^2}{2} + x[\gamma_a E(v_a|a, y) - \gamma_y E(v_y|a, y)]$$

Here, v_a and v_y are the subject's intrinsic valuations of contributing to a public good a and of material reward ya respectively, $C(a)$ is the utility cost of contributing to the public good and $R(a,y)$ is the so-called reputation function.[41] Additionally,

$$E(v_a|a,y) = \bar{v}_a + \rho(y)\left[ka - \bar{v}_a - \bar{v}_y y - \bar{r}(a,y)\right]$$

$$E\left(v_y\middle|a,y\right) = \bar{v}_y + \chi(y)\left[ka - \bar{v}_a - \bar{v}_y y - \bar{r}(a,y)\right]$$

$$\rho = \frac{\sigma_a^2 + y\sigma_{ay}}{\sigma_a^2 + 2y\sigma_{ay} + y^2\sigma_y^2} \qquad\qquad y\chi = 1 - \rho$$

In the experiment, contributing a unit of a corresponds to a monetary decrease of a, which is absorbed by the cost term, and an income of $0.7a$ from the group project so that $y = 0.7$. Our setting is identical to the case of sponsor matching (see Footnote 10 in BT) where contributors are rewarded in the same (monetary) currency, generating $v_a = v_y$ and $\gamma_y = 0$, such that $\sigma_a^2 = \sigma_y^2$, $\sigma_{ay} = 1$, and hence $\rho > 0$. Additionally, PG contribution is made prior to taking publication into account, so that $\bar{r}(a,y) = 0$ in the above signal extraction problem. Hence R can be written as an increasing function of a:

$$R(a) = \bar{\mu}_a \bar{v}_a + \mu(ka - 1.7\bar{v}_a)$$

where

$$\mu \stackrel{\text{def}}{=} \bar{\mu}_a \rho = x\bar{\gamma}_a \rho = \frac{R_a}{k}$$

Note that $\mu > 0$ if contribution is visible ($x > 0$), since agents are assumed care about appearing prosocial ($\bar{\gamma}_a > 0$, fixed across agents). μ thus corresponds to the scaled marginal reputational return for contributing a.

According to Proposition 1 of BT, the optimal contribution for each agent is

$$a^* = \frac{v_a + v_y y}{k} + \mu$$

[41] The cost function $C(a)$ is assumed to be convex such that the utility for income, represented as $-C(a)$, is concave. The quadratic functional form is chosen so that the reputation vector $E(\boldsymbol{v}|a)$ is differentiable in a. See Footnotes 10 and 17 in BT.

Note first that without reputational concern the optimal contribution is

$$\hat{a} = \frac{v_a + v_y y}{k} < a^*$$

That is, in the PG subjects contribute less than what they would have if they knew their contribution would be made public.

The utility of the subject of contributing $\hat{a}$ prior to knowing that this contribution would be made public is

$$U(\hat{a})|_{x=0} = \left(v_a + v_y y\right)\hat{a} - \frac{k\hat{a}^2}{2}$$

while after realizing the publication

$$U(\hat{a}) = \left(v_a + v_y y\right)\hat{a} - \frac{k\hat{a}^2}{2} + R(\hat{a}) = U(\hat{a})|_{x=0} + R(\hat{a})$$

b_C, defined to be the reputational loss from making PG contribution public, thus corresponds to the difference between the above utilities, that is $b_C = -R(\hat{a})$. This has a positive variance and can be either positive or negative depending on the chosen PG contribution $\hat{a}$.[42] Those who have contributed sufficiently will find that R is positive and thus decrease their bid, while those who have not contributed a sufficient amount will incur a reputational cost and thus increase their bid. Hence, ex-ante it is not possible to predict the sign of $b_{NC} - b_N$.

Turning to the correlation of bids with PG contribution, note that

$$b_{NC} = b_N + b_C = b_N - R(\hat{a})$$

Since we do not expect that b_N, the disutility of publishing name and participation, is correlated with PG contribution, therefore it follows that $\frac{db_{NC}}{da} = -R_a = -k\mu < 0$ and hence the following prediction:

Hypothesis 1b: There is a negative correlation between bids for publishing contribution information and PG contributions.

[42] In particular, there is a unique and common threshold $a_0 = \frac{\bar{v}_a(1.7\rho - 1)}{\rho k}$, such that $R(a_0) = 0$, beyond which making contribution public is reputationally enhancing and below which it is reputationally damaging.

Finally, we exclude individual privacy concern to arrive at the CIP $= b_{NC} - b_N = b_C = -R(\hat{a})$ and that $\frac{dCIP}{da} = -R_a = -k\mu < 0$, yielding the closely related prediction:

Hypothesis 1c: CIP is decreasing with PG contribution.

The corresponding analysis can be made when studying the change in bids going from *NS* to *NCS*.

A1.2 Increased visibility

We can next compare bids in *NC* and *NCS*. Recall that bids in *NC* can be expressed as $b_{NC} = b_N + b_C$, where $b_C = -R(\hat{a})$. Bids in *NCS* can similarly be expressed as $b_{NCS} = b_N + b_S + b_C$, the disutility of publishing name and participation, plus the disutility of publishing the selfie (for example, due to privacy concerns or if subjects are concerned about the attractiveness of the selfie), plus the reputational cost of publishing PG contribution where $b_C = -R'(\hat{a})$, the reputational term evaluated at the higher visibility x'. The addition of the selfie thus results in a selfie premium consisting of b_S, the additional disutility from having a selfie published, plus the extra reputational cost $\left(-R'(\hat{a}) - \left(-R(\hat{a})\right)\right)$. To evaluate the sign of this extra cost, express

$$R(\hat{a}) = x[\bar{\gamma}_a \bar{v}_a + 1.7\bar{\gamma}_a \rho(v_a - \bar{v}_a)]$$

and note that x has the first-order effect of amplifying the reputational gain or loss of making contribution public. Whenever $R(\hat{a}) < 0$, $R_x < 0$: for those who are hurt by the publication of PG contribution, increasing the visibility by adding a selfie results in an increase in reputational cost ($R(\hat{a}) - R'(\hat{a}) > 0$). If $R(\hat{a}) > 0$, $R_x > 0$: for those with a positive reputation for contributing a high amount, increasing the visibility will increase the reputational gain even more. However, if these subjects state a positive reservation price *NC* ($b_{NC} = b_N + b_C > 0$), this implies a positive individual privacy concern ($b_N > 0$) which should lead to a disutility from having their selfie published ($b_S > 0$). Hence, unless the

subject has made a sufficiently high PG contribution and very much wants the selfie to be published, the increase in visibility is expected to lower R or contribute further to privacy concern and hence result in a higher bid.

Hypothesis 2a: A selfie will increase the bid for publishing contribution information.

Turning next to variation in bids, note that

$$Var(b_{NCS}) = Var(b_N + b_S + b_C) = Var(b_N + b_S) + Var(b_C) + 2Cov(b_N + b_S, b_C)$$
$$> Var(b_N + b_S)$$

as long as $b_N + b_S$ and b_C are not too negatively correlated. We again have no reason to expect negative correlation between the disutility of publishing name and selfie and publishing PG contribution. Hence we have

Hypothesis 2b: A selfie will increase the variance of bids.

Finally, it is straightforward to show that the selfie premium is decreasing as contribution increases since $\frac{d}{da}\big(b_S + R(a) - R'(a)\big) = R_a - R'_a = k\,\mu - k\,\mu' < 0$ whenever $\mu' > \mu$ and hence $x' > x$.

Hypothesis 2c: Selfie premium is decreasing with PG contribution.

A2. Instructions

Instructions for T1 are provided below. Instructions for T2 and T3 can be derived from these.

You are about to participate in an experiment on decision-making. Before we start, please make sure your phones are on silent and on flight mode, and put away all personal belongings.

This experiment consists of two questionnaires and five stages. You will start the experiment with Questionnaire 1, which is followed by each of the five stages. In Stage 1, you will interact with another randomly chosen participant. In the remaining Stages, you will be making decisions on your own. You will conclude the experiment with Questionnaire 2.

The experiment will take place through your computer terminals. Please do not talk or try to communicate with other participants during the session. If you have any question, please raise your hand and the experimenter will approach you to answer it. You have also been provided with a pen and paper which you are free to use, for example to aid with calculations.

Today's session will last up to 1.5 hours. After the session you will receive your experimental payment. This payment consists of a **participation fee of 50kr** plus your **experiment earnings.** Your experiment earnings will depend on your own decisions, on the decision of another participant, and on chance. It is therefore important to think about each of your decisions carefully.

After Questionnaire 1 and prior to each of the five stages, the computer program will pause. During this time you will receive instructions for the next stage.

You are free to withdraw your participation at any time during the experiment, but if you choose to do so you will not receive any payment.

Are there any questions at this point?

We will now start the experiment with Questionnaire 1. Please answer the questions on your computer screen to the best of your ability.

At this time we ask you to take a self-picture (“selfie”) using the camera on your mobile phone and save the image (this simply means: make sure it is not deleted). The selfie image should contain your face, such as that in a passport photo, but it should not contain any part of another individual in the room. There is no other requirement and you are free to make whatever facial expression you choose.

Please do NOT use your mobile phone for any other purpose. Once you are done taking the selfie, please put down your mobile phone face down at the side of your table.

If you do not have a mobile phone with a camera function, please raise your hand and we will lend one to you for use during the experiment.

You are about to begin with Stage 1. Out of Stage 1 and Stage 2, only one will be implemented and used for payment. Which stage is chosen will be determined by a random draw at the end of the experiment, and this chosen stage will be applied to all participants in this session.

Stage 1

In this stage, each participant will be randomly matched with another participant in this room to form a group of 2. All participants are provided with the same instructions.

At the start of Stage 1, you will be given a sum of 135kr, called your endowment. Your task is to decide how to use your endowment. You have to decide how much of the 135kr you want to contribute to a group project and how much to keep for yourself. You can choose to contribute from the following amounts: 0, 15, 30, 45, 60, 75, 90, 105, 120, 135.

After all group members have made their decisions, your experiment earnings from Stage 1 will be calculated. The earnings consist of 2 parts:

i) The amount you kept for yourself.

ii) The income from the group project, which equals 0.7 x the total contribution of both group members.

The earnings of each group member are calculated the same way, meaning that each group member receives the same income from the project. Suppose the sum of the contributions of all group members is 180kr. In this case each member of the group receives an income from the project of 0.7*180=126kr. If the total contribution to the project is 15kr, then each member of the group receives an income of 0.7*15=10.5kr from the project. All decimals will be rounded **up** to the next whole number.

When considering how much you should contribute, consider the following. Each 1kr that you do not contribute to the project adds 1kr to your income. Supposing that you contribute this 1kr to the project instead, then the total group contribution would rise by 1kr. Your income from the project would rise by 0.7*1=0.7kr. However the income of the other group member would also rise by 0.7kr, so that the total income of the group from the project would rise by 1.4kr. Your contribution to the project therefore also raises the income of the other group member. On the other hand you also earn an income for each 1kr contributed by the other group member to the project. For each 1kr contributed by the other member you earn 0.7*1=0.7kr.

You will have five practice rounds to ensure you understand how pay-offs are calculated. Next, you will move on to the actual round where you will be asked to choose the amount you wish to contribute to the project. Please press the Continue button when you have finished. You will find out whether or not this stage is chosen for payment, and hence your earnings from this stage, at the end of the experiment.

In summary, if this stage is chosen for payment your earnings in SEK in Stage 1 are: (135 – your contribution to the project) + 0.7*(total contributions to the project).

Stage 2

From this stage onward, you will be making decisions on your own and are no longer part of a group.

At the start of Stage 2, you will again be given an endowment of 135kr. Your task is to decide how to use your endowment. You have to decide how much of the 135kr you want to invest in a risky project. Any remaining amount NOT invested will go towards your experiment earnings. You can choose to invest from the following amounts: 0, 15, 30, 45, 60, 75, 90, 105, 120, 135.

After you have made your decision, your experiment earnings from Stage 2 will be calculated. The earnings consist of 2 parts:

i) The amount NOT invested in the risky project.

ii) The income from the risky project, which equals 3 x the amount you invested with a probability of 0.5, or 0 (zero) with a probability of 0.5. Each participant's outcome will be determined individually by a random draw of the computer.

Suppose you choose to invest 60kr. Then your income from the risky project equals 180kr with a probability of 0.5, or 0 with a probability of 0.5. This means that your total earnings from this stage, including the remaining 75kr you kept, equals 255kr with a probability of 0.5 or 75kr with a probability of 0.5.

Suppose on the other hand that you choose to invest 0kr. Then your income from the project is zero and your total earnings from this stage are simply 135kr.

You will be asked to choose the amount you wish to invest in the risky project. Please press the Continue button when you have finished. You will find out whether or not this stage is chosen for payment, and hence your earnings from this stage, at the end of the experiment.

In summary, if this stage is chosen for payment your earnings in SEK in Stage 2 are:
(135 – your investment in the risky project) + 3*(your investment in the risky project) with probability 0.5, or
(135 – your investment in the risky project) with probability 0.5.

The next three stages concern your valuation of the right to publish some information about you. Only one of these stages will be implemented and used for payment. Which stage is chosen will be determined by a random draw at the end of the experiment, and this chosen stage will be applied to all participants in this session.

Stage 3

You have the opportunity to sell the right to publish your name and the selfie you took earlier on our researcher's webpage, with information about your participation in this experiment. Specifically, the webpage would display **your selfie with the following text: "[Your name] took part in an experiment on decision-making."** No other information, including your selfie ratings, will be displayed. Historically, this webpage was viewed by around 40 people per month, but there is no guarantee that this number would stay the same after your information is published. If it is published, your information will be displayed on the webpage during the period Dec 2015 – Jan 2016.

It is important for you to understand that you have no obligation to sell the right to publish your information, and we will give you instructions below on how you can ensure that your information will not be published.

If you are willing to sell the right to publish your information, the transaction works as follows. **You will be asked to name the minimum price in kr, P_1, at which you are willing to sell the right to publish the information above. That is, P_1 is your reservation price. The actual price will be determined individually by a random draw of the computer which is completely independent of P_1.** This randomly drawn price can take any value between 0 and 200kr.

If the random draw is lower than P_1, none of your information will be published and you will not receive any money in this stage.

If the random draw is higher than or equal to P_1, you will be required to e-mail your image to us and show a photo ID at the end of this session and we will pay you the price as determined by the random draw. Your name, image and participation information will be published on the webpage. This information may also be used for future research purposes and appear in research papers and/or presentations about this experiment, but apart from these your information will be used for NO other purpose.

Please note that it does not make sense to enter P_1 exceeding your true valuation. By doing so you may lose money. If your valuation of the right to publish your information is for example 10kr, you should enter 10 as P_1. If the random draw decides that we pay a price of 40kr, you will receive 40kr even if the P_1 amount you entered was only 10kr. However, if you had entered 50 as P_1 your information will not be published and you will not receive any money at all in this stage. In particular, note that we will never pay a price more than 200kr. Note also, if you do not mind that the information about you is published, you maximize your expected pay-off by setting P_1 equal to 0, since then the probability that you sell the right is 1.

If you are not willing to sell the right to publish your information, you should enter the amount 201 as P_1. Since the computer will only draw numbers between 0 and 200, we will never draw a price that is higher than or equal to 201 and as a result we will never publish your information. This also means that you will not earn any money in this stage.

Your decision is final and no renegotiation would take place.

You will have three practice rounds to ensure you understand how pay-offs are calculated. These consist of two practice questions followed by a simulation round, where you will have the chance to familiarize yourself with a hypothetical transaction. The randomly drawn price

is hypothetical and will not affect your earnings, and no right to publish any information will actually be bought or sold.

When you have finished the simulation round, you will continue with an actual transaction. This time, the randomly drawn price will determine whether or not you sell the right to publish your information as per the instructions above.

In summary, if this stage is chosen for payment your earnings in SEK in Stage 3 are:
The price randomly drawn by the computer if it exceeds P_1, OR zero otherwise.

Stage 4

This time, you have the opportunity to sell the right to publish your name and the selfie you took earlier on our researcher's webpage, with information about your contribution to the group project in Stage 1 of this experiment. Specifically, the webpage would display **your selfie with the following text: "[Your name] took part in an experiment on decision-making. He/She had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. [Your name] decided to contribute [X] to this group project."** No other information, including your selfie ratings, will be displayed. If it is published, your information will be displayed on the webpage during the period Dec 2015 – Jan 2016.

It is important for you to understand that you have no obligation to sell the right to publish your information, and we will give you instructions below on how you can ensure that your information will not be published.

If you are willing to sell the right to publish your information, the transaction works as follows. **You will be asked to name the minimum price in kr, P_2, at which you are willing to sell the right to publish the information above. That is, P_2 is your reservation price. The actual price will be determined individually by a random draw of the computer which is completely independent of P_2.** This randomly drawn price can take any value between 0 and 200kr.

If the random draw is lower than P_2, none of your information will be published and you will not receive any money in this stage.

If the random draw is higher than or equal to P_2, you will be required to e-mail your image to us and show a photo ID at the end of this session and we will pay you the price as determined by the random draw. Your name, image and contribution information will be published on the webpage. This information may also be used for future research purposes and appear in research papers and/or presentations about this experiment, but apart from these your information will be used for NO other purpose.

Please note again that it does not make sense to enter P_2 exceeding your true valuation by the same reasoning as in Stage 3.

If you are not willing to sell the right to publish your information, you should enter the amount 201 as P_2. Since the computer will only draw numbers between 0 and 200, we will never draw a price that is higher than or equal to 201 and as a result we will never publish your information. This also means that you will not earn any money in this stage.

Your decision is final and no renegotiation would take place.

In the next screen, you will face an actual transaction. The randomly drawn price will determine whether or not you sell the right to publish your information as per the instructions above.

In summary, if this stage is chosen for payment your earnings in SEK in Stage 4 are: The price randomly drawn by the computer if it exceeds P_2, OR zero otherwise.

Stage 5

In this stage, we are interested in knowing your valuation of the right to publish the information from the transaction conducted in Stage 3 earlier. Specifically, how much would you have to be paid for us to publish P_1, your reservation price, or the fact that you chose not to sell the right to publish your information?

You have the opportunity to sell the right to publish the above information on the previously mentioned researcher's webpage. Specifically, the webpage would display the following text: **"[Your name] took part in an experiment on decision-making. He/she was willing to publish his/her name and selfie with information about his/her participation in this experiment for a minimum price of [your P_1] OR he/she was not willing to publish his/her name and selfie with information about his/her participation in this experiment."** No other information, including your selfie ratings, will be displayed. If it is published, your information will be displayed on the webpage during the period Dec 2015 – Jan 2016.

It is important for you to understand that you have no obligation to sell the right to publish your information, and we will give you instructions below on how you can ensure that your information will not be published.

If you are willing to sell the right to publish your information, the transaction works as follows. **You will be asked to name the minimum price in kr, P_3, at which you are willing to sell the right to publish the information above. That is, P_3 is your reservation price. The actual price will be determined individually by a random draw of the computer which is completely independent of P_3.** This randomly drawn price can take any value between 0 and 200kr.

If the random draw is lower than P_3, none of your information will be published and you will not receive any money in this stage.

If the random draw is higher than or equal to P_3, you will be required to show a photo ID at the end of this session and we will pay you the price as determined by the random draw. Your name and P_1 information (or the fact that you were not willing to publish your information in Stage 3) will be published on the webpage. This information may also be used for future research purposes and appear in research papers and/or presentations about this experiment, but apart from these your information will be used for NO other purpose.

Please note again that it does not make sense to enter P_3 exceeding your true valuation by the same reasoning as in Stage 3.

If you are not willing to sell the right to publish your information, you should enter the amount 201 as P_3. Since the computer will only draw numbers between 0 and 200, we will never draw a price that is higher than or equal to 201 and as a result we will never publish your information. This also means that you will not earn any money in this stage.

Your decision is final and no renegotiation would take place.

In the next screen, you will face an actual transaction. The randomly drawn price will determine whether or not you sell the right to publish your information as per the instructions above.

In summary, if this stage is chosen for payment your earnings in SEK in Stage 5 are: The price randomly drawn by the computer if it exceeds P_3, OR zero otherwise.

A3. Screenshots

Figure 1: Published information on researcher webpage

Alexandra Stenberg took part in an experiment on decision-making. She had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Alexandra Stenberg decided to contribute 30 kr to this group project.

Lisa Åkerman took part in an experiment on decision-making. She had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Lisa Åkerman decided to contribute 30 kr to this group project.

Karl Grudén took part in an experiment on decision-making. He had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Karl Grudén decided to contribute 0 kr to this group project.

Jacob Meesak took part in an experiment on decision-making. He had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Jacob Meesak decided to contribute 0 kr to this group project.

Emil Blohmé took part in an experiment on decision-making. He had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Emil Blohmé decided to contribute 0 kr to this group project.

Emmy Turesson took part in an experiment on decision-making. She had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Emmy Turesson decided to contribute 0 kr to this group project.

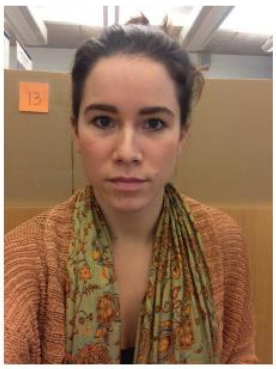
Tuyen Thi Nguyen took part in an experiment on decision-making. She had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Tuyen Thi Nguyen decided to contribute 120 kr to this group project.

Kristoffer Nilsson took part in an experiment on decision-making. He had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Kristoffer Nilsson decided to contribute 0 kr to this group project.

Figure 2: Published information with selfie on researcher webpage

Mattias Lundin took part in an experiment on decision-making. He had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Mattias Lundin decided to contribute 15 kr to this group project.

Joel Persson took part in an experiment on decision-making. He had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Joel Persson decided to contribute 0 kr to this group project.



Marta Radinovic Lukic took part in an experiment on decision-making. She had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Marta Radinovic Lukic decided to contribute 15 kr to this group project.

Libo Liu took part in an experiment on decision-making. She had to choose what amount to contribute to a project with another person. Total contribution from both participants was multiplied by 1.4 and then split evenly. Each participant also kept the amount not contributed. Libo Liu decided to contribute 45 kr to this group project.

A4. Robustness Checks

A4.1 Hypothesis 1

We test the robustness of our results regarding the relationship between PG contribution and bids for its publication. First we show in Table 9 and Table 10 the correlations among control variables which are expected to affect the subject's valuation for the right to publish her name and selfie (used in the regressions of Table 5 and Table 6). While selfie frequency has a relatively high correlation with Visual SM, post-regression estimates of VIF shows no evidence of multicollinearity, as indicated in Footnote 27.

Table 9: Correlation matrix of selected predictors of NC

	NPI	Visual SM	Text SM	Selfie frequency
NPI	1			
Visual SM	0.09	1		
Text SM	-0.05	0.11	1	
Selfie frequency	-0.01	0.47***	0.22***	1

Table 10: Correlation matrix of selected predictors of NCS

	NPI	Visual SM	Text SM	Selfie frequency	Rating
NPI	1				
Visual SM	0.17**	1			
Text SM	-0.04	0.12	1		
Selfie frequency	0.16**	0.37***	0.21***	1	
Rating	0.22***	0.05	0.03	0.19**	1

"*NPI*" is the subject's score in the Narcissistic Personality Inventory (NPI-16) (Ames et al., 2006), ranging from 0-1. "*Visual SM*" is the sum of scores from the responses to questions about the daily usage of Facebook and Instagram, where: 1 is "I do not have an account here", 2 is "Less than 30 minutes", 3 is "30 minutes - 1 hour" and 4 is "More than 1 hour". "*Text SM*" is the corresponding score for daily usage of Twitter. "*Selfie frequency*" is the subject's frequency of selfie-taking, where: 1 is "Never", 2 is "Less than 1 time per month", 3 is "1-3 times per month", 4 is "1-6 times per week", and 5 is "Once or more per day". "*Rating*" is the subject's rating of their own selfie on a scale from 1-7, where 1 is very unattractive and 7 is very attractive. *** p<0.01, ** p<0.05, * p<0.1.

Our dependent variables *NC* and *NCS* are bids elicited in the BDM mechanism which can only take values between 0 and 201. This means that subjects who might have been extremely unwilling to publish their information, and who therefore may have a reservation price higher than 201, had to bid 201. Similarly, subjects who are extremely willing to publish their information to the point where they would have been willing to pay for it had no choice

but to state a bid of zero rather than a negative number. We therefore run tobit regressions on the BDM bids to test the robustness of our results. As shown in Table 11, PG contribution still has a negative effect on bids, though again the effect is only significant when a selfie is included. The coefficient of PG contribution in the tobit regressions has a higher absolute value than in the OLS regressions presented in Table 5 columns (1-2), suggesting that the true effect of PG contribution on the uncensored reservation price is higher than previously shown.

Table 11: Tobit regressions of *NC* and *NCS* bids

	(1) *NC* T2+T3	(2) *NCS* T1+T2
PG contribution	-0.27	-0.46**
	(0.18)	(0.19)
T2	-1.43	-1.01
	(17.39)	(17.13)
NPI	23.15	-5.23
	(43.95)	(46.92)
Visual SM	-12.05*	-21.48***
	(6.99)	(7.68)
Text SM	9.93	31.00***
	(11.84)	(11.14)
Selfie frequency	-9.97	-10.00
	(8.86)	(8.48)
Rating		-5.87
		(6.67)
CRT	-10.88	-20.90**
	(8.94)	(8.82)
Age	-1.64	-0.42
	(2.15)	(2.08)
Male	-39.18**	-14.98
	(19.11)	(19.27)
Swedish	-20.98	-40.69**
	(18.44)	(17.54)
Econ	11.05	-2.07
	(16.99)	(17.10)
Constant	185.41**	268.80***
	(75.73)	(80.24)
Observations	156	163

"*NPI*" is the subject's score in the Narcissistic Personality Inventory (NPI-16) (Ames et al., 2006), ranging from 0-1. "*Visual SM*" is the sum of scores from the responses to questions about daily usage of Facebook and Instagram, where: 1 is "I do not have an account here", 2 is "Less than 30 minutes", 3 is "30 minutes - 1 hour" and 4 is "More than 1 hour". "*Text SM*" is the corresponding score for daily usage of Twitter. "*Selfie frequency*" is the subject's frequency of selfie-taking, where: 1 is "Never", 2 is "Less than 1 time per month", 3 is "1-3 times

per month", 4 is "1-6 times per week", and 5 is "Once or more per day". "*Rating*" is the subject's rating of their own selfie on a scale from 1-7, where 1 is "very unattractive" and 7 is "very attractive". "*CRT*" is the number of correct responses to three Cognitive Reflection Test questions. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

A4.2 Hypothesis 2

Our results for Hypothesis 2a are also based on linear regressions with censored BDM bids as the dependent variable. Using tobit specification as shown in Table 12 does not change the sign nor significance of the selfie's effect on bids. Publishing PG contribution with a selfie increases the subject's bid. Again, the coefficients in the tobit regressions are greater in absolute value than those in the linear regressions shown in Table 6 columns (1-2), indicating that the true effect of adding a selfie on a subject's unwillingness to publish their contribution information is higher than previously shown.

Table 12: Tobit regressions of BDM1 and BDM2 bids

	(1) BDM1 T2+T3	(2) BDM2 T1+T2
PG contribution	-0.51***	-0.23
	(0.19)	(0.19)
Selfie included	36.12**	38.61**
	(18.03)	(16.94)
NPI	-24.83	33.14
	(45.38)	(46.35)
Visual SM	-17.44**	-16.25**
	(7.25)	(7.57)
Text SM	15.09	25.86**
	(12.15)	(11.05)
Selfie frequency	-10.80	-8.67
	(9.05)	(8.44)
Rating		-3.64
		(6.57)
CRT	-11.26	-20.37**
	(9.21)	(8.70)
Age	-1.64	-0.32
	(2.13)	(2.11)
Male	-34.65*	-18.19
	(19.69)	(19.03)
Swedish	-23.34	-39.04**
	(18.97)	(17.37)
Econ	16.80	-5.22

	(17.53)	(16.91)
Constant	227.43***	176.38**
	(77.15)	(82.55)
Observations	156	163

"*Selfie included*" is a dummy variable equal to 1 for bids for *NS* or *NCS*, or 0 for bids for *N* or *NC*. In column (1), a "*Selfie included*" value of 1(0) corresponds to being in T2(T3). In column (2), a value of 1(0) corresponds to T1(T2). "*NPI*" is the subject's score in the Narcissistic Personality Inventory (NPI-16) (Ames et al., 2006), ranging from 0-1. "*Visual SM*" is the sum of scores from the responses to questions about daily usage of Facebook and Instagram, where: 1 is "I do not have an account here", 2 is "Less than 30 minutes", 3 is "30 minutes - 1 hour" and 4 is "More than 1 hour". "*Text SM*" is the corresponding score for daily usage of Twitter. "*Selfie frequency*" is the subject's frequency of selfie-taking, where: 1 is "Never", 2 is "Less than 1 time per month", 3 is "1-3 times per month", 4 is "1-6 times per week", and 5 is "Once or more per day". "*Rating*" is the subject's rating of their own selfie on a scale from 1-7, where 1 is "very unattractive" and 7 is "very attractive". "*CRT*" is the number of correct responses to three Cognitive Reflection Test questions. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

A4.3 Crowding-out of social image concerns

We next check the robustness of the crowding-out effect to take into account the bounds for bids. There may be a concern that bids for *NS* are already higher than *N* due to the presence of the selfie, and hence when *C* is added, there is less room for *NS* bids to increase. The CIP with selfie (*NCS* minus *NS*) will therefore be lower than the CIP without selfie (*NC* minus *N*), not because the selfie crowds out the concern for *C* but rather because of the bid limits imposed in the experiment. As Table 13 shows, removing subjects who bid 201 in either BDM stage in T1 (12 subjects) and T3 (6 subjects) leaves 65 subjects in T1 and 64 subjects in T3. In this subsample, the results still hold: both average CIP and its standard deviation are lower with the selfie than without.

Table 13: CIP data excluding maximum bidders

	T1 (with Selfie) N=65	T3 (without Selfie) N=64	P-value
Average CIP*	3.46	19.31	0.0539
St Dev of CIP***	20.61	43.56	0.0000

We next regress *withcont* (pooling *NCS* and *NC*) on the treatment dummy T1, controlling for *nocont* (pooling *NS* and *N*) and other variables. We see in Table 14 that T1 is

still significant: the bids for publishing information is lower by 13 SEK if a selfie is included, even after controlling for the *nocont* bids and PG contribution.

Table 14: OLS regression of *NCS* and *NC* pooled

	(1) *withcont*
nocont	0.85***
	(0.07)
PG contribution	-0.06
	(0.07)
T1	-12.60**
	(6.33)
NPI	3.15
	(17.07)
Visual SM	-4.43
	(2.80)
Text SM	4.93
	(4.80)
CRT	-3.84
	(2.98)
Age	-0.41
	(1.10)
Male	-13.51*
	(6.91)
Swedish	-9.90
	(6.71)
Econ	2.38
	(6.28)
Constant	67.89*
	(34.50)
Observations	129
Adjusted R-squared	0.59

"*withcont*" is *NCS* and *NC* pooled. "*nocont*" is *NS* and *N* pooled. "*NPI*" is the subject's score in the Narcissistic Personality Inventory (NPI-16) (Ames et al., 2006), ranging from 0-1. "*Visual SM*" is the sum of scores from the responses to questions about daily usage of Facebook and Instagram, where: 1 is "I do not have an account here", 2 is "Less than 30 minutes", 3 is "30 minutes - 1 hour" and 4 is "More than 1 hour". "*Text SM*" is the corresponding score for daily usage of Twitter. "*Selfie frequency*" is the subject's frequency of selfie-taking, where: 1 is "Never", 2 is "Less than 1 time per month", 3 is "1-3 times per month", 4 is "1-6 times per week", and 5 is "Once or more per day". "*Rating*" is the subject's rating of their own selfie on a scale from 1-7, where 1 is "very unattractive" and 7 is "very attractive". "*CRT*" is the number of correct responses to three Cognitive Reflection Test questions. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

A4.4 Selfie-taking and cooperation

While PG contribution is a ratio variable, in the experiment subjects could only choose from

ten different values to avoid the obvious 50-50 division between the amount to keep and the amount to contribute to the group project. We show in Table 15 that the conclusions we draw regarding the effect of selfie-taking on cooperation are robust to ordered logit specification of the regressions. Taking a selfie has no effect on PG contribution for the whole sample in column (1). However when we restrict the sample to subjects who take selfies at least once a week (column 2) or even once a month (column 3), taking a selfie in the experiment has a negative and significant effect on PG contribution. This can be seen in the negative coefficient for "Take selfie" in columns (2-3): taking a selfie reduces the subject's log-odds of choosing a higher level of PG contribution.

Table 15: Ordered logit regressions of PG contribution

	(1) PG contribution	(2) PG contribution	(3) PG contribution
Take selfie	-0.21	-1.53**	-0.76*
	(0.26)	(0.63)	(0.40)
Risk investment	0.01***	0.01	0.01*
	(0.00)	(0.01)	(0.01)
Age	0.04	-0.01	-0.02
	(0.03)	(0.11)	(0.07)
Male	-0.51*	-0.01	-0.44
	(0.26)	(0.55)	(0.38)
Swedish	-0.48*	0.32	-0.64*
	(0.26)	(0.58)	(0.38)
Econ	-0.11	-0.25	0.04
	(0.24)	(0.52)	(0.35)
Constant cut1	0.35	-1.07	-1.46
	(0.89)	(2.53)	(1.73)
Constant cut2	0.56	-0.99	-1.30
	(0.89)	(2.53)	(1.73)
Constant cut3	0.99	-0.57	-0.66
	(0.89)	(2.52)	(1.72)
Constant cut4	1.39	-0.04	0.04
	(0.89)	(2.51)	(1.71)
Constant cut5	1.81**	0.62	0.45
	(0.89)	(2.51)	(1.71)
Constant cut6	2.16**	1.21	0.90
	(0.89)	(2.53)	(1.72)
Constant cut7	2.58***	1.93	1.43
	(0.90)	(2.57)	(1.73)

Constant cut8	2.79***	2.19	1.66
	(0.91)	(2.59)	(1.74)
Constant cut9	3.11***		1.79
	(0.92)		(1.74)
Observations	233	55	108

Column (1): the whole sample, column (2): subjects who take selfies at least weekly, and column (3): subjects who take selfies at least monthly. "*Take selfie*" is a dummy variable equal to 1 for subjects in T1 or T2. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

The effect of selfie-taking on PG contribution is also robust to including other variables that are significantly different between frequent selfie-takers and the rest, i.e. self-esteem and social media activities, as presented in Table 16. The effect is marginal in the group of weekly selfie-takers (p=0.0504), for whom Twitter activity also significantly reduces PG contribution. Neither self-esteem nor activity on Facebook and Instagram significantly affects PG contribution.

Table 16: OLS regression of PG contribution with other individual characteristics

	(1) PG contribution	(2) PG contribution	(3) PG contribution
Take selfie	-6.57	-28.04*	-17.96**
	(6.66)	(13.95)	(8.95)
Risk investment	0.31***	0.23	0.27**
	(0.08)	(0.14)	(0.12)
Age	1.13	-0.31	-0.34
	(0.80)	(2.27)	(1.53)
Male	-10.62	2.01	-3.58
	(6.96)	(12.52)	(8.94)
Swedish	-10.37	11.06	-9.30
	(6.61)	(12.85)	(8.67)
Econ	-3.24	-4.11	2.55
	(6.13)	(11.44)	(7.94)
SE	0.24	-1.41	0.24
	(0.61)	(1.26)	(0.89)
Visual SM	-1.34	3.31	1.87
	(2.49)	(5.44)	(3.49)
Text SM	-4.02	-14.02**	-5.09
	(4.29)	(6.92)	(5.16)
Constant	20.40	81.93	38.18
	(29.67)	(73.09)	(48.66)
Observations	233	55	108

Adjusted R-squared	0.06	0.10	0.05

Column (1): the whole sample, column (2): subjects who take selfies at least weekly, and column (3): subjects who take selfies at least monthly. "*Take selfie*" is a dummy variable equal to 1 for subjects in T1 or T2. "*SE*" is the subject's Rosenberg self-esteem score (Rosenberg, 1965), ranging from 0-30. "*Visual SM*" is the sum of scores from the responses to questions about the daily usage of Facebook and Instagram, where: 1 is "I do not have an account here", 2 is "Less than 30 minutes", 3 is "30 minutes - 1 hour" and 4 is "More than 1 hour". "*Text SM*" is the corresponding score for daily usage of Twitter. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

A5. Higher-level Reasoning by Subjects

In a more exploratory part of the experiment, we also investigate if people are prepared to pay to conceal more sophisticated information sets. BT provide some intuition for an agent who is eager to engage in a prosocial action but does not want to appear to be reputation-seeking. When publicly offered a material reward, this agent will accept it and risk appearing to be motivated by the reward rather than turn it down, since "doing so could lead the audience to question an agent's motivation along another dimension: is he genuinely disinterested, or merely concerned about appearances?" because "good deeds that are too obvious may backfire" (p. 1669). While this can be considered relatively high-level reasoning to expect from our data, we investigate whether or not such sophisticated behavior can be traced in the sample we have by eliciting bids for the publication of the subject's previous bid. According to Hypothesis 1, bids for the publication of contribution information are informative about the subject's PG contribution: a subject who contributed a high amount in the PG should be willing to publish this information for a low minimum price. However, if this low bid is made public, the audience may interpret this as signaling the fact that the subject wants to show-off her high PG contribution. Consequently, she may now wish to conceal the first bid by bidding high to prevent its publication, generating what we term the "show-off premium", defined as the bid for the publication of the first bid minus the first bid. We do not rule out that a high second bid may also follow a high first bid for subjects that want to hide a low PG contribution, that is, a low show-off premium for low contributors or even other high contributors who care less about being seen as seeking publicity. However, if the first bid contains no contribution information, bidding low may simply signal a lack of privacy concern which should rationally then be followed by a similarly low second bid. Hence there is no reason for the bid to increase when no contribution information is published. Taking into account other (privacy) reasons for which people may want to conceal a low or high first bid,

the show-off premium with contribution information should be higher than that without contribution information. However, bidding for the publication of bids can be difficult to grasp conceptually and given the similarity in the two BDM tasks we could also expect that subjects state similar values for both bids, which would weaken our results. Nevertheless, we cannot a priori rule out the presence of higher-level thinking in subjects and present the following hypothesis:

Hypothesis A1: The show-off premium when the first bid contains contribution information is higher than that when the first bid contains no contribution information.

Implementation

BDM3 elicits bids for the publication of BDM1 bids, accompanied by a sentence explaining what information BDM1 contains. For example, in T3 BDM1 elicits bids for publishing *NC*: the subject's name and PG contribution. Hence in BDM3 the published sentence reads: "[Subject's full name] took part in an experiment on decision-making. He/she was willing to publish his/her name with information about his/her contribution to a group project in this experiment for a minimum price of [subject's BDM1 bid]" OR "[Subject's full name] took part in an experiment on decision-making. He/she was not willing to publish his/her name with information about his/her contribution to a group project in this experiment." in the relevant case.

Result

Hypothesis A1 tests for the prevalence of higher-level thinking within a subject who does not want to appear to be reputation-seeking, which would take the form of a higher show-off premium, defined as BDM3-BDM1, whenever BDM1 contains contribution information

(T2+T3 vs T1). However, our data suggests the opposite: the show-off premium is higher in T1 than in T2 and T3 combined (-3 vs -10, WMW test p=0.08, n=233). The average BDM3 bids are in fact lower than BDM1 bids in all treatments, though the difference is not significant (WMW tests in T1, T2 and T3 yield p=0.65, 0.14 and 0.88 respectively). To conclude, no evidence of such sophisticated reasoning is seen in our data. Instead, bids in BDM3 appear to be negatively correlated with cognitive skills (Pearson correlation coefficient -0.22, p=0.001, n=233).[43] This is not surprising given that the profit-maximizing dominant strategy is to bid zero. Although subjects should be more practiced in the BDM mechanism by the time they reach BDM3, bidding for the publication of bids can be difficult to grasp conceptually. The strong relationship with low cognitive skills shows that there is a lot of noise in this data and results on BDM3 should thus be interpreted with caution.

[43] While this argument can also be true for BDM1 and BDM2, the negative relationship between bids and CRT is strongest for BDM3 (Pearson correlation coefficients for BDM1 and BDM2 are -0.11, p=0.09, and -0.20, p=0.003 respectively).