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Reducing default and framing effects in privacy decision-making

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ABSTRACT

Framing and default effects have been studied for more than a decade in different disciplines. A common criticism of these studies is that they use hypothetical scenarios. In this study, we developed a real decision environment: a Facebook application in which users had to decide whether or not they wanted to be automatically publicly tagged in their friends' pictures and/or tag their friends in their own pictures. To ensure ecological validity, participants had to log in to their Facebook account. Our results confirmed previous studies indicating a higher tagging rate in positively framed and accept-by-default conditions. Furthermore, we introduced a manipulation that we assumed would overshadow and thereby reduce the effects of default and framing: a justification highlighting a positive or negative descriptive social norm or giving a rationale for or against tagging. We found that such justifications may at times increase tagging rates.

Keywords

Default effect, framing effect, privacy nudge, Facebook privacy, photo tagging, Facebook application.

INTRODUCTION

Social network users are required to make privacy decisions on a regular basis. These decisions are susceptible to framing effects (irrational influences of the way an option is presented to the user on the outcome of their decision (Tversky & Kahneman, 1981)) and default effects (similar influences of the option that is chosen by default (Samuelson & Zeckhauser, 1988)). Johnson et al. (2002) and Lai and Hui (2006) independently found framing and default effects to have a significant impact on users' privacy decisions (i.e., their willingness to be notified concerning other health surveys or to receive a newsletter). Both studies showed users a checkbox with a label. The framing was manipulated via the label wording ("Please send me newsletters" versus "Please do not send me newsletters"). The default was manipulated by whether the checkbox was initially set to accept or reject the newsletters. Both studies found that framing and defaults have a separate and additive effect on users' decisions.

A common criticism of default and framing studies is that they involve hypothetical scenarios: users are not moti-

vated to indicate their true preferences. The decisions we investigate in the current study involve consenting to (automatically) tagging oneself in one's friends' Facebook pictures and tagging one's friends in one's own pictures. To ensure ecological validity, users had to log in to their Facebook account, and hence they perceived real risks and real benefits as a consequence of their decisions.

We conducted a study measuring users' acceptance (the "tagging rate") of such an automatic photo-tagging system. We integrate default and framing effects, and we introduce a method that is hypothesized to overshadow and thereby reduce these effects: In some experimental conditions, we provide a "justification" that highlights a presumed positive or negative descriptive social norm of using the photo-tagging system ("3%" vs. "97% of participants used the auto-tagger"); in other conditions, this justification provides a rationale for or against tagging ("the tagged pictures could be embarrassing" vs. "tagging may increase your social bond"); a final condition showed no justification. Depending on the underlying cause of the default and framing effects, either of these justifications should be able to reduce the default and framing effects.

RELATED WORK AND HYPOTHESIS DEVELOPMENT

Main effects of framing and defaults

Levin and Gearth (1988) argue that a positive frame elicits arguments in favor of the action, while a negative frame elicits arguments against the action. Hardisty et al. (2009) demonstrate that this effect is mediated by the order in which decision-makers evaluate positive and negative arguments (the "query theory"). A positive (negative) frame causes users to evaluate positive (negative) arguments first. Because of this, the majority of arguments they evaluate are positive (negative), and they end up more (less) likely to consent. Alternatively, framing can be explained as a normative effect: a decision-maker may interpret the positive (negative) framing of a decision as representing the positive (negative) attitude the requester has towards the decision (Sher & McKenzie, 2006). As such, a positive frame suggests an injunctive norm supporting the decision, while a negative frame suggests an injunctive norm against the decision.

In our study on Facebook photo tagging, framing is manifested in whether users are given the option to apply

the automated tagging procedure, or rather the option to NOT apply it. Based on existing evidence (Johnson et al., 2002; Lai & Hui, 2006), and given that framing effects can be explained by the query theory and injunctive social norms (Hardisty & Weber, 2009; Sher & McKenzie, 2006), we state the following hypothesis:

H1: A positive framing results in a higher tagging rate than a negative framing.

Dinner et al. (2011) present three possible causes of default effects. The first two causes have to do with the *effort* of choosing the default, either in terms of physical effort (Samuelson & Zeckhauser, 1988) or mental effort (Tversky & Kahneman, 1974). As a third cause, they demonstrate that the query theory can explain default effects: a positive (negative) default causes users to evaluate positive (negative) arguments first, which makes them more (less) likely to consent with the request. Finally, McKenzie et al. (2006) show that people tend to infer the attitude of the messenger not only from the framing of a request but also from the default option. Combined with a framing effect, a default endorsement of the framed option may reinforce the implicit social norm communicated by the message framing.

In our study, the default setting is manifested in whether the automated tagging procedure will be applied or rather NOT applied if the user simply does not change the current setting. Based on existing evidence (Johnson et al., 2002; Lai & Hui, 2006), and given that default effects can be explained by cognitive and mental effort, query theory, and injunctive social norms (Dinner et al., 2011; McKenzie et al., 2006), we state the following hypothesis:

H2: The Tag by Default conditions result in a higher tagging rate than the Do Not Tag by Default conditions.

Effect moderators

Framing and defaults are often considered harmful because they may cause users to behave counter to their “true preferences” (John, Acquisti, & Loewenstein, 2011). Here we describe two interventions that may diminish or even eradicate their effect. These moderators have not been studied in prior work, but their effectiveness can be hypothesized based on the psychological mechanisms that may underlie the framing and default effects.

Studies have shown that for a norm to influence people’s behavior; it has to be focal (Cialdini, Kallgren, & Reno, 1991). So, when two normative cues provide conflicting information, people are more likely to behave in accordance with the norm expressed by the most salient cue. Given that both framing and default effects can be explained as an *injunctive* social norm (McKenzie et al., 2006; Sher & McKenzie, 2006), we hypothesize that a sufficiently salient and conflicting *descriptive* social norm can reduce or even eradicate the framing and default effects. In our study on Facebook photo tagging, this descriptive social norm takes the form of a “justification” indicating that either a small minority or a large majority

of all other participants have chosen to use the automated tagging procedure. We state the following hypotheses:

H3: Normative cues moderate the effect of framing on tagging: A conflicting norm (negative cue + positively framed decision or positive cue + negatively framed decision) will reduce the difference in tagging rates between the positive and negative framing conditions.

H4: Normative cues moderate the effect of defaults on tagging: A conflicting norm (negative cue + tag by default or positive cue + do not tag) will reduce the difference in tagging rates between the Tag by Default and Do Not Tag by Default conditions.

According to the query theory, the framing of a request (Hardisty & Weber, 2009) and the default (Dinner et al., 2011) influence the order in which people query their minds for positive and negative arguments: they will evaluate arguments in favor of the frame/default and against the alternative first, before they evaluate arguments against the frame/default and in favor of the alternative. This will, in turn, increase their likelihood to decide in the direction of the frame/default. As a means to counter the query-ordering effect of respectively framing and defaults, researchers have attempted to “force” participants to ask queries in a specific order. Indeed, when participants are asked to do this, the framing and default effects disappear, and participants’ decisions simply follow the imposed query order (Dinner et al., 2011; Hardisty & Weber, 2009).

From the perspective of an (online) application, however, forcing users to follow a certain query order is unwanted if not infeasible. Hence, we introduce query supporting rationales which arguably encourage users to give precedence to the queries in line with this rationale. If this is indeed the case, then we expect users’ decisions to simply follow the rationale-supported query order, and the framing and default effects will disappear:

H5: Query-supporting rationale-based cues moderate the effect of framing on tagging rates: A conflicting rationale will reduce the difference in tagging rates between the positive and negative framing conditions.

H6: Query-supporting rationale-based cues moderate the effect of defaults on tagging rates: A conflicting rationale will reduce the difference in tagging rates between the Tag by Default and Do Not Tag by Default conditions.

METHOD

Participants were told that we are developing a Facebook application that can automatically tag people in pictures. We recruited 924 participants (plus 50 pilot participants) through online platforms. They were paid \$1.30 for their participation. We required participants to have an active Facebook account with at least ten friends. On average, participants had 427 Facebook friends.

Participants were asked to log into Facebook, giving basic profile and friends list permissions to our app. They were then informed about the benefits and consequences of

using the application, making the value proposition of the eventual decision unambiguously clear for all participants. They were then asked to tag the people in four researcher-provided photos, followed by a phase where they would correct mistakes in photos that were ostensibly tagged by the algorithm. We made sure that participants would have to make no corrections at all, so as to demonstrate that the algorithm was accurate and reliable.

Participants would then be given the opportunity to use the auto-tagging procedure themselves—a question we manipulated in terms of default, framing, and justification. In our pilot study, we gave participants the option to tag themselves in *all* of their friends’ photos, and to tag *all* of their friends in *all* of their own photos. However, none of the participants accepted this offer, regardless of the experimental condition (a testament to the realism of our study, but a problem nonetheless). To reduce the overall risk of the decision, we reduced its scope: We asked participants for the names of three Facebook friends they regularly interact with, developed a decision page for each of these friends, “identified” a number of “previously unseen photos” (in reality, a random number between 5 and 15), and offered participants to tag themselves and/or their friend in those photos (Figure 1).



Figure 1. An example experimental condition (accept by default, positive framing, negative rationale-based justification) in the “decision” phase of the study.

Manipulations

The study follows a 2x2x5 between-subjects design. Like most existing studies on defaults and framing, it combines a default setting manipulation (accept versus reject) with a framing manipulation (positive versus negative) as shown in Table 1. We add a “justification” manipulation, with two normative justifications (positive/negative), two rationale-based justifications (positive and negative), and a condition with no justification:

1. Negative descriptive normative justification: “(Note: 3% of our study participants chose this option)”
2. Positive descriptive normative justification: “(Note: 97% of our study participants chose this option)”
3. Negative rationale-based justification: “(Note: Auto-tagged photos will show up on the Facebook walls of the tagged friends, where their friends can see them. Beware that they may not want others (parents, boss)

to see some of these photos, because they could be embarrassing!)”

4. Positive rationale-based justification: “(Note: Auto-tagged photos will show up on the Facebook walls of the tagged friends, where their friends can see them. This will strengthen your friendship and let your friends relive the good times they had with you!)”
5. None

Final questionnaires

In the final part, participants were asked to list reasons to use or not to use the auto-tagger to tag themselves in their friend’s pictures and their friend in their own pictures, for each of the three friends. Participants were then debriefed about the purpose of the study and ascertained that the auto-tagger was fake and had not tagged any of their photos. This study was certified by an institutional review board and researchers addressed all ethical concerns.

Table 1. The Default and Framing manipulations.

Presentation	Default	Framing
<input checked="" type="checkbox"/> Automatically tag me in those pictures.	Accept	Positive
<input type="checkbox"/> Automatically tag me in those pictures.	Reject	Positive
<input checked="" type="checkbox"/> Do NOT automatically tag me in those pictures.	Reject	Negative
<input type="checkbox"/> Do NOT automatically tag me in those pictures.	Accept	Negative

RESULTS

Each participant made six yes/no decisions—for each of the three friends, they indicated whether they allowed the auto-tagger to tag their friend in their pictures and whether they allowed it to tag themselves in their friend’s pictures. We run multilevel logistic regressions with a random intercept to account for repeated measurements per participant. Our DV is the decision to allow/prevent the auto-tagger (tagging rate) and the default, framing, and justifications are the IVs. Justification is modeled as an interaction between “type” (none, normative, rationale-based) and “valence” (positive, negative), with no distinction in valence in the “no justification” condition.

We first analyzed the framing and default effects regardless of the justification (see Table 2), and found a significant positive main effect for both framing (H1) and defaults (H2), with no interaction effect between the two. Figure 2 displays the framing and default effects

Table 2. The effect of framing and defaults on tagging rate.

	Odds ratio	p value
Overall odds	0.143	
Default (tag vs. do not tag)	10.340	< .001
Framing (pos. vs. neg.)	4.854	< .001
Default x Framing	0.993	0.991

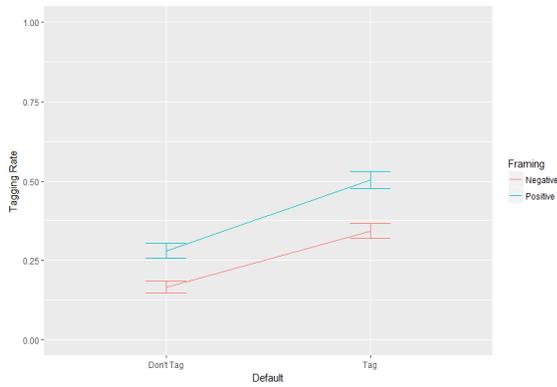


Figure 2. The effects of defaults and framing on tagging rate.

Table 3. The effect of framing and justifications on tagging.

	Odds ratio	<i>p</i> value
Baseline odds (Just. = none)	0.210	
Justification type (vs. none)		
Descriptive normative	0.805	.608
Rationale-based	0.514	.122
Justification type x Valence		
Descriptive normative	2.138	.105
Rationale-based	1.372	.523
Framing (pos. vs. neg.)	4.558	.031
Justification type x Framing		
Descriptive normative	1.292	.762
Rationale-based	0.714	.695
Just. x Valence x Framing		
Descriptive normative	6.129	.053
Rationale-based	0.674	.690

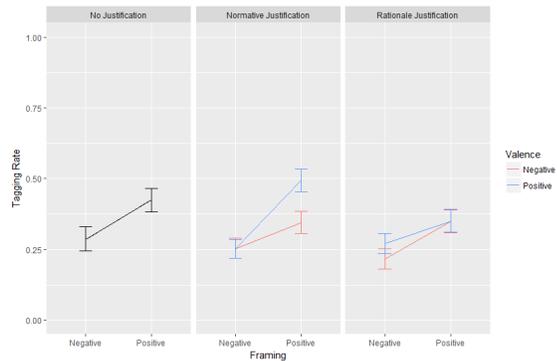


Figure 3. The effect of framing and justifications on tagging.

To test H3 and H5, we ran a factorial model with framing, justification type and valence. Framing and valence were centered, but justification type was dummy-coded with “none” as baseline. Since valence only applies to the normative and rationale-based justification conditions, we exclude main effects of valence. Table 3 shows that there is no main effect of either of the two justifications, nor is their interaction with valence significant. In the “no justification” condition, framing has a significant overall effect. There is no significant overall interaction between framing and justification type, but there is a marginally significant interaction between framing, justification, and

valence in the normative justification condition. However, this effect does not reduce or extinguish the default effect (H3). Rather, Figure 4 shows that the framing effect is *stronger* in the positive normative cue condition.

To test H4 and H6, we ran a similar model with defaults, justification type, and valence. We did not run the two models together due to convergence issues. Table 4 shows that in the “no justification” condition, defaults have a marginally significant effect. There is also a significant interaction between defaults and justification type: the effect of defaults is ~7 times larger in the rationale-based condition (see rightmost panel of Figure 4). This effect is contrary to H4 and H6, which predicted that justifications would *weaken* the default effect. There is also no three-way interaction, i.e., the default-exacerbating effect of the rationale-based justification occurs regardless of valence.

Table 4. The effect of defaults and justifications on tagging.

	Odds ratio	<i>p</i> value
Baseline odds (Just. = none)	0.225	
Justification type (vs. none)		
Descriptive normative	0.695	.383
Rationale-based	0.460	.068
Justification type x Valence		
Descriptive normative	2.585	.043
Rationale-based	1.376	.522
Default (tag vs. do not tag)	3.355	.079
Justification type x Default		
Descriptive normative	2.446	.283
Rationale-based	7.065	.022
Just. x Valence x Default		
Descriptive normative	0.470	.420
Rationale-based	1.583	.646

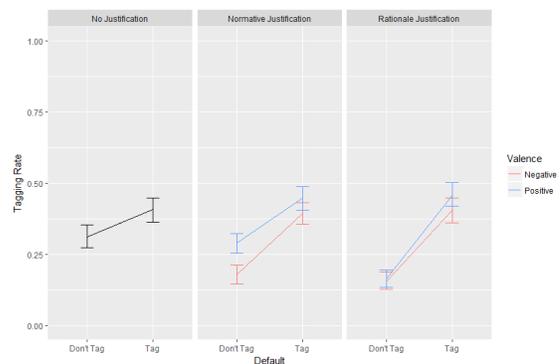


Figure 4. The effect of defaults and justifications on tagging.

DISCUSSION

We were able to confirm framing and default effects in the context of photo tagging on Facebook. This proved to be a very realistic environment—the surprising results of our pilot study suggest that participants strongly believed that the photos would be tagged if they accepted the offer. Hence, we demonstrate that default and framing effects are not just an artifact of studies with unmotivated participants:

these effects persist even when participants are highly motivated to make the correct decision.

In contrast to our hypotheses, the justifications were not able to reduce framing and default effects. This suggests that these effects persist even in light of appeals to norms and rationales. We did, however, find that positive normative cues can boost tagging rate in combination with positive framing, while positive rationale-based justifications support participation in the positive default condition. Thus, it seems that justifications that are consistent with the framing or default setting may increase tagging rates (i.e., reduce privacy concerns).

It needs to be acknowledged that in the baseline condition only approximately 25% of participants decided to opt-in to the auto picture tagging. Thus, another experiment is necessary investigating the described effects in a situation where the opt-in is more common. This will help us identify whether conceptually consistent justifications always have a concern-diminishing effect, or whether they may also help increase privacy-oriented behavior.

LIMITATIONS AND FUTURE WORK

Our study was conducted in a Facebook environment, so we cannot generalize our findings to other privacy settings. Second, we did not test the assumed underlying mechanisms like cognitive effort or normative pressure of the default, framing, and justification manipulations. Thus, more research is necessary to control for covariates and check the effects of our manipulations in order to establish causality. Also, follow-up studies must consider additional variables. To test for the general efficacy of justifications, future research needs to include a neutral default and framing condition to ultimately assess main effects of justifications. Lastly, our study was conducted in a static environment. In order to analyze the dissipation of framing and default effects, future research needs to apply repeated decision scenarios over time.

CONCLUSION

This study attempted to overcome framing and default effects in privacy decision making in a realistic experiment by introducing normative and rationale-based justifications. Instead, we ultimately found a mechanism to further *increase* framing and default effects under certain circumstances. If justifications were conceptually complementary to the initial decision bias and both proposed giving up privacy, tagging rates were even higher than under simple framing and default conditions.

These findings provide considerable contributions for research and practice. Theoretically, we extend findings from existing work on default and framing effects to collaborative privacy management on online social networks. Moreover, we included potential moderators of the default and framing effects that could serve as instruments to detect the underlying causes of the default and framing effects. Generally, our findings point towards the

dangers of justifications in combination with established biases which may induce users to act irresponsibly. Platform managers need to carefully consider our findings when offering privacy decisions so as to not accidentally urge users to compromise their privacy against their will. Also, we inform users about these effects that they need to mind when making privacy-related decisions.

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