
Smile or Cry? – The Impact of a Victim’s Facial Expression on Helping Behavior in Emergency Applications

André Dahlinger

University of St. Gallen
St. Gallen, SG 9000, Switzerland
andre.dahlinger@unisg.ch

Felix Wortmann

University of St. Gallen
St. Gallen, SG 9000, Switzerland
felix.wortmann@unisg.ch

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Abstract

Today’s wide spread of smartphones bares high potential for the effectiveness of emergency or helping applications. But helping is a complex psycho-social process. This has important implications for the UI design of such applications. In our research, we tested the effect of a victim’s facial expression (sad vs. happy) on a potential helper’s willingness to help in an online scenario. We further investigated, how the facial expression interacts with another well researched social phenomenon: the bystander effect. The results of this early research were mostly not as expected, but reveal interesting insights that are discussed and that open an exciting research avenue with important practical implications when it comes to the design of digital helping systems.

Author Keywords

Facial Expression; Bystander Effect; Helping Behavior; Community; Security.

ACM Classification Keywords

H.5.2. Information interfaces and presentation: User Interfaces.

Introduction

Helping each other is a fundamental aspect in human societies. However, the process of helping struggles with severe limitations based on psycho-social phenomena. There is a huge body of research on the determinants of helping behavior. The willingness to help may depend on interpersonal factors like gender, relationship and physical attractiveness [7]. It may also depend on the environmental setting: one setting-specific phenomenon is the bystander effect, according to which the probability of help for a victim decreases with the number of people standing by the help event [14]. With the help of modern interfaces, we may overcome some of these limitations, as they allow us to manipulate critical psycho-social determinants of helping behavior.

The spread of smartphones and its power in connecting people led to many smartphone-enabled helping applications being released lately, e.g. in the context of first-aid (United Hatzalah), being threatened in a taxi (Uber panic button) or disasters like fires (Sirene 2.0). Although we highly appreciate the work of these solutions, we see a lack of sophisticated HCI research on this topic that might provide HCI guidelines to improve the design of helping applications. The before mentioned possibilities of information design demand for a closer look from an HCI perspective on how we react to a call for help in dependence of what information is presented and how information is presented. With that knowledge we will hopefully be able to increase the effectiveness of helping tools and applications powered by information systems (IS).

In this paper we focus on two promising determinants of helping behavior: the bystander effect and the facial

expression of the victim. On the basis of existing research we further hypothesize that there is an interaction between both determinants. We conducted an online experiment that partly supports our hypotheses, but we also found surprising effects that are discussed and may stimulate further research and have important practical implications to improve helping-application designs.

Theory and Related Work

In light of the vast spread of smartphones it seems to be an appealing approach to leverage the idea of community-based help, i.e. instead of one person, there is a group of people that might help, thereby increasing the probability that someone will help [21]. Successfully applied to neighborhood watches [4], this approach was expanded to other domains such as first-aid [27] or public disaster warning [28]. However, calling more than one person for help at the same time might lead to a lower probability for the help seeker to receive help due to the bystander effect [14]. The bystander effect was mostly researched in face-to-face settings, but also in non-face-to-face situation like in an online forum [25], a chat room [16] or an e-mail request [2]. Hence, the idea of IS-enabled community-based help might backfire. This has to be considered when designing an interface for an IS-powered helping system [9].

Another important aspect of helping behavior is the appearance of the victim. Research on the social function of emotional expression [12,13,18] indicates that we could indeed leverage this means to increase the probability of help. "Expressions of emotions affect beliefs about the expresser. People infer what emotion a person is feeling on the basis of facial

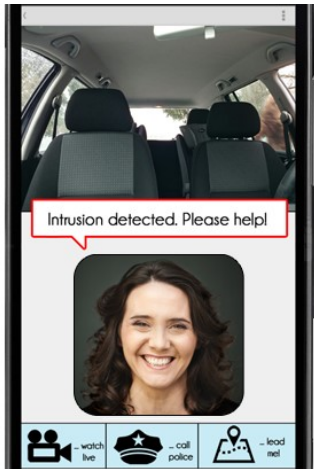


Figure 1: happy face

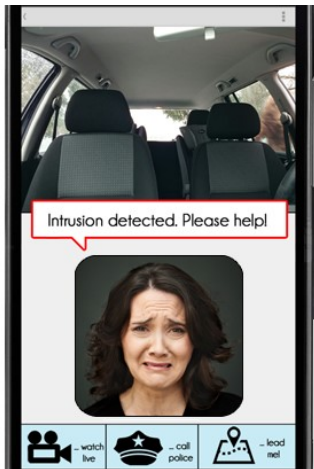


Figure 2: sad face

expressions [...]"[24:87]. These beliefs may guide the behavior of people around. Seeing a person happily smiling therefore should signal to other people that the person feels fine and is in a comfortable situation with no help needed. On the other hand "sadness results in the perception that the expresser is in need of help [...]"[24:87]. Putting a sad person in a context of danger or crime, one might refer the sadness to the severity of the situation. This is of special importance, as a meta-analysis found that the bystander effect is weaker or even reversed in more dangerous situations [7], because they are recognized with less ambiguity and bystanders are seen as a (necessary) source of physical support for the helper [11,20]. This moderation indicates that there could be a specific combination of the facial expression of the victim and whether one or many helpers are alarmed, that reveals a maximum likelihood of help to be provided.

Based on the theoretical background and the research presented above, we predict the following:

- H1: A victim with a sad face (vs. happy face) increases willingness to help.*
- H2: The absence of bystanders (vs. presence of bystanders) increases willingness to help.*
- H3: The bystander effect is attenuated when the victim has a sad face.*

Method

To test the presented hypotheses, we conducted a 2 (bystander vs. no bystander) x 2 (happy vs. sad) between-subjects design in an online experimental setting. Here, participants were introduced to a fictive

scenario with mock-up app screens. In this scenario the participants were told they would carry an app that alerts you when a nearby car sets off a silent alarm (i.e. where an intrusion was detected), and then lets you get an image from inside the car to evaluate the situation, plus an image of the car owner either with a happy (Figures 1) or a sad face (Figure 2). Afterwards the app would show you that either you were the only person near the affected car (Figure 4) or that also other persons nearby received an alert (Figure 5). On the same screen, three possibilities to help were presented: evaluate the alarm for the owner, call the police or check on the spot. For each, the participants were asked for their willingness to perform the action. The survey ended with questions on demographics and took the participants 5 minutes and 30 seconds on average to complete. To make sure that participants paid attention to and understood the scenario, we included multiple choice questions at the end of the introduction that had to be answered correctly to be able to proceed.

Participants

201 participants were recruited with Amazon Mechanical Turk (MTurk) [5] and compensated with a one dollar. To assure that the participants were fluent in English language, we required them to be located in the United States. The average age was 34.9 years (SD = 11.5). The gender was distributed with 43.3% being female and 55.7% male. 15.5% had a high school degree, 7.2% had a technical degree, 28.2% had a 1-3 year college degree, 35.1% had a bachelor's degree, 12.9% had a graduate degree and 0.5% stated "other degree". Two participants did not complete the whole experiment and were case-wise deleted in further analysis.

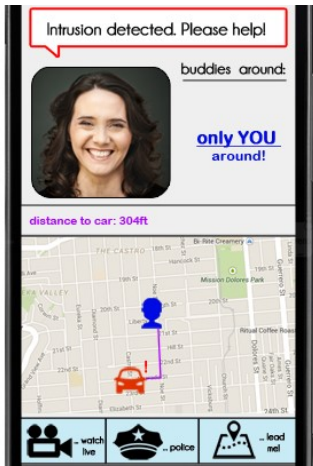


Figure 4: happy face & no bystander

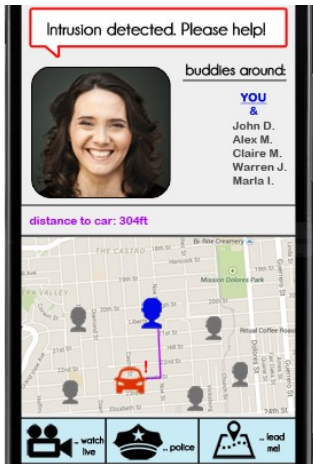


Figure 5: happy face & bystander

	emotional expression			
	happy	sad	happy or sad	
bystander	without bystander	N = 50 M = 5.2 SD = 1.08	N = 50 M = 4.71 SD = 1.36	N = 100 M = 4.96 SD = 1.24
	with bystander	N = 46 M = 4.92 SD = 1.08	N = 53 M = 4.91 SD = 1.30	N = 99 M = 4.92 SD = 1.20
	with or without bystander	N = 96 M = 5.07 SD = 1.08	N = 103 M = 4.82 SD = 1.33	N = 199

Table 1: descriptive statistics of the willingness to help for all four conditions

Measures

To measure the participant's willingness to help as the dependent variable, we asked them for their willingness to perform each helping behavior (live-stream in the car and either only evaluate the alarm, call the police or further check on the spot) on a 7-point Likert scale from "not at all / by no means" at the lower extreme to "definitely" on the upper extreme. The mean of the three items served as a measure for willingness to help. Cronbach's Alpha was low with an alpha = .59.

Results

We first present the descriptive statistics of the dependent variable and group sizes for all conditions (Table 1). Hypotheses H1 and H2 are tested each with a simple ANOVA using IBM SPSS Statistics 21 [6]. The interaction (H3) was analyzed with a SPSS Macro [10]. Statistical analysis revealed no significant difference

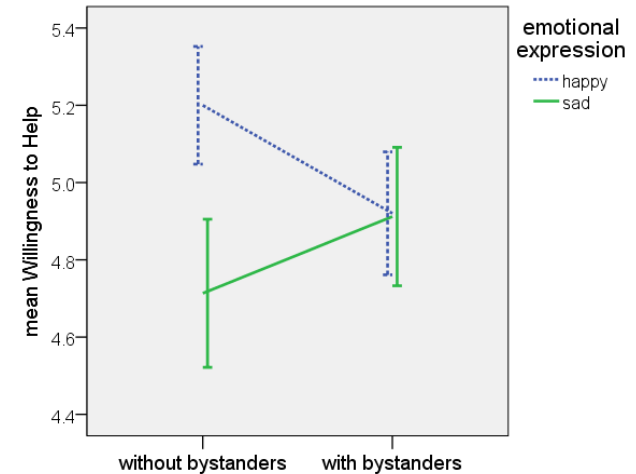


Figure 3: graph of mean willingness to help with +/- 1 standard error bar

between the happy and the sad emotional expression condition ($F(1,197) = 2.11, p = .15$). Additionally, the direction of the effect is not as hypothesized. We did not find a significant difference between the bystander- and the no-bystander condition ($F(1,197) = .06, p = .81$). The interaction (H3) was not significant ($t(195) = 1.39, p < .1$), but the effect went in the expected direction (Figure 3).

Conclusion and Discussion

In this paper we wanted to investigate the role of the facial expression of emotion and the bystander effect for helping applications. The goal of this research is to get a better understanding of how these factors influence our willingness to help. With the possibilities of modern information technology, we can systematically manipulate the appearance of the victim to increase effectiveness of IT-powered helping

systems like the one we tested in our scenario. Based on related work, we expected (H1) victims with a sad facial expression to evoke higher willingness to help than victims with a happy face, (H2) lower willingness to help when bystanders are present and (H3) the bystander effect being attenuated in case the victim's facial expression is sad. We were able to marginally support H3. In fact, in the sad face condition the bystander effect seems to not just be attenuated but even reversed. Further, we got surprising results for hypotheses 1 and 2. Participants on average stated a higher willingness to help when the victim showed a happy face vs. showing a sad face. Together with the reversed bystander effect of H3, this probably led to an out-levelling of a bystander main effect that was expected in H2.

There is some research on donation behavior that could be seen as similar to our setting. In line with our predictions, most of this research supports the empathy-helping hypothesis, according to which sad depictions of people in need increase feelings of empathy and hence promote donation behavior [1,8,23]. Our results tended towards the opposite direction, though. This could be explained by recent research on the effect of strength emotions, which have shown to further increase a person's donation behavior [15]. We would argue however that the operationalization of evoking strength emotions in the latter research differs quite substantially from our setting. Furthermore, it is not clear, to what extent different types of helping behavior are comparable.

We see methodological and conceptual limitations that could have caused the results of this preliminary research and should be tackled in the future.

Methodologically the sample drawn from MTurk may have been suboptimal, because MTurk participants have an incentive to run through surveys quite quickly. Our research scenario demands full attention to the details. The low average of time for completion of the survey indicates that our participants may not have spent enough attention for the expected effects to become salient. A happy face in a situation of need surely may be perceived as odd and hence raise attention. This attentional bias could be an alternative explanation of the unexpected main effect of the happy face that unexpectedly provoked a higher willingness to help than the sad face. From a conceptual perspective, we may have missed to measure attractiveness as a powerful confounding variable. Research on helping behavior showed that attractive people are more likely to receive help [3,26] and a smiling person is perceived as more attractive [19,22]. Hence, the higher attractiveness of the smiling happy victim may have dominated the higher neediness of the sad victim as determinant of willingness to help. Another issue may have been weakness of stimuli, thereby not eliciting enough behavioral differences between the groups. The bystander effect seems to reveal only small effects in online settings as mentioned by other authors [17]. Plus, in our scenario the victim was not even directly involved in the situation, but only indirectly as being the owner of the car.

Implications and Future Work

Our first results are weak, but revealed some interesting and promising insights to build on. On the basis of our discussed learnings, we see three main approaches for our future research. First, we want to shed more light on the psychological mechanisms behind our research setting. Therefore, we will measure

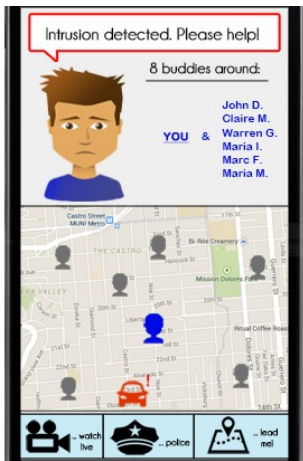


Figure 6: alternative UI with sad avatar



Figure 7: alternative UI with happy avatar

important underlying constructs, like perceived seriousness of the situation and attractiveness of the victim. Second, we might switch to a different scenario such as a physical attack of the victim to elicit stronger effects. Last not least, the image of the victim could be changed from a real photography to an avatar in order to investigate the practical potential of our research. This is of specific relevance for several reasons: Making pictures of oneself with distinct facial expressions might not be easy for most people, except you are an actor. To overcome this, you could simply use an avatar (Figures 6 & 7). This bares further possibilities and advantages: you may not run into the mentioned problem of low attractiveness; you could display additional facial expressions; the face displayed might adapt to characteristics of the help receiver in order to increase willingness to help; and finally, you might avoid privacy issues. On the other hand, the use of an avatar could make a helping call appear more artificial, generally less realistic and hence less severe. People might (unconsciously) think, "it is just an avatar" and consequently show a lower willingness to help.

Information technologies are becoming an everyday tool for social interactions between people. The possibilities on information processing and provision might even enhance interactional efficacy, but may also have counter-intentional effects, if not well implemented. In our example, whether a person smiles or cries can make a difference in a potential helper's decisional process of helping or not helping. Further, the facial expression seems to reversely influence another well researched effect in a rather non-intuitive, surprising way. There may be other important factors and interactions that one should be aware of when designing the user interface of a helping application.

CHI research is needed to uncover these interactional mechanisms and raise awareness for proper design. That way, we can promote the possibilities of information technology to be leveraged for the good and hopefully make people help each other more frequently.

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