The Power of Collective Endorsements:
Credibility Factors in Medical Crowdfunding Campaigns

Jennifer G. Kim[1], Ha Kyung Kong[1], Karrie Karahalios[1], Wai-Tat Fu[1], Hwajung Hong[2]
[1]University of Illinois at Urbana-Champaign, [2]Ulsan National Institute of Science and Technology
{jgkim2, hkong6, kkarahal, wfu}@illinois.edu, hwajung@unist.ac.kr

ABSTRACT
Traditional medical fundraising charities have been relying on third-party watchdogs and carefully crafting their reputation over time to signal their credibility to potential donors. As medical fundraising campaigns migrate to online platforms in the form of crowdfunding, potential donors can no longer rely on the organization's traditional methods for achieving credibility. Individual fundraisers must establish credibility on their own. Potential donors, therefore, seek new factors to assess the credibility of crowdfunding campaigns. In this paper, we investigate current practices in assessing the credibility of online medical crowdfunding campaigns. We report results from a mixed-methods study that analyzed data from social media and semi-structured interviews. We discovered eleven factors associated with the perceived credibility of medical crowdfunding. Of these, three communicative/emotional factors were unique to medical crowdfunding. We also found a distinctive validation practice, the *collective endorsement*. Close-connections' online presence and external online communities come together to form this collective endorsement in online medical fundraising campaigns. We conclude by describing how fundraisers can leverage collective endorsements to improve their campaigns' perceived credibility.

Author Keywords
Crowdfunding; Medical fundraising; Credibility

ACM Classification Keywords
H.5.3. Group and Organization Interfaces; Computer-supported cooperative work; Web-based interaction

INTRODUCTION
In the United States, where universal health coverage is not the norm and patients pay high out-of-pocket medical fees, medical expenses are the leading cause of bankruptcy [13]. Recently, patients and their families have raised substantial

sums to defray their out-of-pocket medical costs using online crowdfunding sites such as GiveForward, YouCaring, and GoFundMe [27]. In one notable GoFundMe campaign, a family raised $250,000 in a week for their son Steve's [1] stem cell treatment [26]. The contributions alleviate the beneficiaries' medical costs and boost their morale through encouraging online comments from family, friends, or even from people whom they've never met [27]. Such medical crowdfunding sites enable non-experts to easily create a sharable webpage for fundraising (Figure 1). Creators, most often the fundraiser, share and advertise the campaign on online platforms (e.g., Facebook, Twitter, Reddit, or email) to solicit donations.

Unfortunately, medical crowdfunding stories are not always philanthropic. In two very public cases, campaigns raised money using pictures and text from Steve's fundraising page [28]. The deception outraged the public and Steve's family, who were distraught with the attempts to exploit their situation. GoFundMe acknowledges that the exploitation of medical crowdfunding platforms for personal gain is an ongoing problem [3].

Ensuring the credibility of charitable fundraising has presented a challenge for decades. Charitable organizations established different strategies to increase their perceived credibility to potential donors. These strategies include obtaining a third-party organization's validation [11], celebrity endorsements [16], and handwritten correspondence from the beneficiary to the donor [33]. As fundraising campaigns migrate to online platforms in the form of personal fundraising, potential donors can no longer rely on the charity's credibility.

Previous research in crowdfunding has largely focused on entrepreneur crowdfunding and its credibility [6, 17, 21]. However, because medical crowdfunding differs significantly from entrepreneur crowdfunding, potential donors may rely on different factors to assess credibility of medical crowdfunding. For example, entrepreneur crowdfunding donors who typically receive a product (i.e., reward) for their donations investigate the fundraiser's expertise in that product domain [6], the estimated delivery date of the product [17], and the professional look of the campaign [21] to evaluate the campaign's credibility. However, medical crowdfunding donors do not receive material goods for their donations. Thus, such signals

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[1] We changed the son's name in the text of this paper.

related to products are unavailable in medical crowdfunding. In contrast to entrepreneur crowdfunding where the fundraisers are often the beneficiaries, in medical crowdfunding, family or acquaintances often act as fundraisers on behalf of the beneficiaries. Another major difference from entrepreneur crowdfunding is that without funding aid, the beneficiary of medical crowdfunding might experience a decrease in life quality, sometimes death.

In this paper, we investigate current practices for assessing the credibility of online medical crowdfunding campaigns. We specifically focus on third-party potential donors[2] who do not have a personal relationship with the beneficiary. To identify the main factors that influence the perceived credibility of campaigns, we conducted a mixed-methods study involving first a preliminary analysis of existing medical crowdfunding campaign-related Reddit comments and then semi-structured interviews with 20 participants. We identified eleven credibility factors. Three communicative/emotional factors, not present in existing credibility literature, emerged in our interviews. From these new credibility factors, we suggest fundraisers and beneficiaries leverage their close-connections' online presence (e.g., existing Facebook or YouTube accounts) and external online communities to signal their campaigns' credibility.
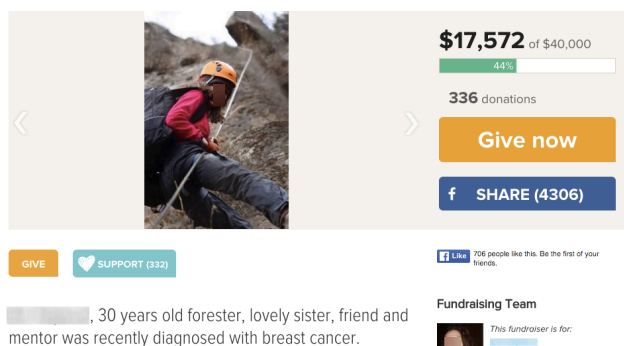

Figure 1. An example of an online medical crowdfunding campaign in GiveForward: Fundraisers can describe the patient's situation, explain the need for raising money, state the fundraising goal, and upload pictures and updates.

RELATED WORK

We begin by discussing previous crowdfunding campaign research. Then, we cover how charitable organizations establish credibility, and conclude this section by discussing how users evaluate credibility on several online platforms.

Crowdfunding Campaigns

Research on crowdfunding to date has largely focused on fundraising by artists and entrepreneurs raising capital to

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[2] From here on, "potential donors" will refer to possible third-party donors, who do not personally know the beneficiary.

Figure 2. An example of a Reddit post: clicking the Reddit post's title redirects users to a corresponding campaign page on a medical crowdfunding site. The comment shown in the figure questions the credibility of the campaign.

pursue their project ideas. Many researchers have identified factors that lead to success of entrepreneur crowdfunding. Inclusion of a video in the campaign description [21], project updates [32], and the size of the fundraiser's personal network [24] increased the likelihood of reaching a funding goal. Reward structures were also associated with campaign success [12,20]. Specifically, the principle of reciprocity, whereby people receive tangible artifacts in exchange for donations, significantly impacted the success of campaigns [20]. Also, fundraisers changed their reward strategy after a failed campaign by reducing the number of reward levels [12]. Finally, recent entrepreneur crowdfunding credibility perception research suggests emphasizing professionalism [17], experience [6], and past success in campaigns [30].

Unlike entrepreneur crowdfunding donors, donors of philanthropic crowdfunding receive no tangible reward for their contributions. However, their donations impact societal welfare. For example, medical crowdfunding helped prevent 3.9 percent of medical bankruptcies across the U.S. [4]. Educational crowdfunding (such as donorschoose.org) supported more than half of the public schools in the U.S. in raising funds for their classrooms [34]. Similarly, Kiva (a crowd-funded micro-financial service) impacted the lives of more than one hundred thousand borrowers by lending funds with no interest [35]. However, few studies have investigated the factors that drive donors' contributions in philanthropic crowdfunding. Althoff and Leskovec found that timely recognition of donors' contributions in DonorsChoose increased the likelihood of a donor's second contribution [1]. For Kiva, the cultural similarity, geographical proximity [5], and social proximity (gender, occupation, and first-name initial) [9] of the lenders to the borrowers increased the chances of lending. In the next section, we explore how previous research in charitable fundraising has addressed credibility.

Charitable Fundraising and Credibility

Traditional charities such as ChildFund, Compassion, and Red Cross use other strategies to signal credibility. For example, Compassion [33] sends personal correspondence from the beneficiary to the donor, and ChildFund utilizes

celebrity endorsements as a proxy for credibility [16]. Additionally, watchdog agencies monitor and assist the charities' adherence to ethical standards. The Better Business Wise Giving Alliance (www.give.org), one of the best-known watchdog agencies, evaluates organizations based on 20 factors covering governance and oversight, effectiveness, financial management, and informational material [36]. Potential donors often rely on watchdog agency approval as a credibility signal for charity organizations and their campaigns [11]. However, neither the watchdog agencies nor the charities report how they measure the credibility of the beneficiaries and the health claims in individual campaigns.

In contrast, our research investigates online medical crowdfunding campaigns created not by established organizations but by individual fundraisers. The emergence of these online campaigns by individuals presents the need for identifying new credibility factors because the credibility factors of traditional organizations do not apply. In the next section, we describe how different online platforms evaluate credibility and what factors strengthen or weaken credibility.

Web Credibility Studies

The perceived credibility of information on the Internet has been extensively studied in the context of various online media including webpages, Twitter, and Wikipedia. Metzger categorized credibility evaluation online into two levels: "the level of the Web site as a whole" [7,8] and "the level of messages residing on Web sites" [19]. Fogg focused on the level of the website as a whole and found that most people evaluated the site's credibility via design-related factors [8]. Conversely, people use logic factors such as argument plausibility [19] more often to evaluate the perceived credibility of information/messages within websites. Studies examining perceived credibility factors at the message level, such as tweets, identified distinctive credibility factors based on the site's purpose. For example, Morris et al. found that rather than relying on the credibility of Tweet content alone, users were influenced by the author's username [22]. Wikipedia is another example where users use distinctive factors to evaluate credibility. Wikipedia users rely on the article's author-editing history [23] and hidden article information [18].

The work above led us to the following research question: *What are the main factors that influence perceived credibility in online medical crowdfunding campaigns?*

METHODOLOGY

To answer our research question, we conducted a mixed-methods study consisting of two phases: a Reddit comment analysis and semi-structured interviews. We chose Reddit[3]

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because crowdfunding sites explicitly recommended the promotion of medical crowdfunding campaigns on the site and 24.4% of the campaigns that were promoted and commented on Reddit spurred active credibility discussion. Anthony et al. championed this style of data collection in their work combining social media codes with surveys to report on technology use [2]. We then conducted semi-structured interviews with 20 participants in our laboratory to identify credibility factors and to investigate why and how the factors affect people's perception of the credibility.

Reddit Comment Analysis

Fundraisers often submit their crowdfunding campaign's link to one or more subreddits. Common content areas are centered around charity, donation, military, and cancer subreddits.

Redditors comment on each other's posts, sometimes leading to active discussions (see Figure 2). Although discussions weighted with skepticism can lead to biased debates, they still reveal important weaknesses in a campaign that could affect its credibility. While medical crowdfunding sites also provide a comments feature for interactions between fundraisers and potential donors, donors often use this feature to leave encouraging notes for the beneficiary rather than to discuss the credibility of the campaign. Reddit comments provided a window into credibility issues surrounding the campaigns that would otherwise be difficult to observe. The following three steps describe how we extracted our campaign sample, identified comments criticizing campaign credibility, and categorized the comments.

Step 1. Extracting Medical Crowdfunding Campaigns
To collect comments corresponding to medical crowdfunding campaign-related posts on Reddit, we first investigated posts that contained links to external crowdfunding sites. Our empirical observation suggested that most of these posts pointed to one of the five major crowdfunding sites with a "medical" funding category– GiveForward, YouCaring, GoFundMe, Fundly, and Life.indegogo. On July 9, 2015, we collected all the Reddit posts (N=1,542) linked with these five sites' URLs (see Table 1) using the Reddit API. Fundraisers often cross-posted campaigns over several different subreddits. We considered duplicate posts as one post and combined all the comments for the post.

Although we extracted posts containing links to the medical crowdfunding sites, our initial collection of 1,542 posts also contained entrepreneur, travel, and education crowdfunding campaigns. To separate the campaigns soliciting money for medical purposes, we first made a list of inclusion keywords based on the medical fundraising categories listed on the GiveForward website (e.g., "medical," "cancer," "surgery," "accident," "transplant," etc.). [4] We then

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randomly sampled 100 posts from the initial collection and examined the linked campaigns to establish a definition of medical crowdfunding campaigns and to refine the list of inclusion keywords. Initially, our definition of medical crowdfunding campaigns included those covering medical expenses for a patient's surgery and treatments. After two researchers read and discussed the 100 sampled campaigns, our final definition of medical crowdfunding campaigns expanded to include medical, living, and/or travel expenses relating to a patient's surgery, treatment, medicine, or medical equipment. The definition excluded campaigns for family resettlement, adoption, and pet-related medical expenses. Our inclusion keywords included "diagnosed," "injury," and "Lyme disease." The exclusion keywords included "dog," "cat," and "bunny."

After the first round of filtering for medical crowdfunding campaigns, we achieved 93% accuracy. We also reviewed false negative and false positive samples from the filtered campaigns. The false negative samples yielded additional inclusion keywords, including "prosthetic," "treatment," and "heart failure." Similarly, we used the false positive samples to identify additional exclusion keywords. In the third round of filtering, we achieved 95% accuracy. Finally, we subsequently removed 31 additional campaigns, including those that sought to raise medical funds for natural disasters, children living in developing countries, and homes damaged in fires. This process resulted in a final pool of 618 identified medical crowdfunding campaigns linked to Reddit posts (see Table 1).

Step 2. Identifying Comments Criticizing Credibility
The 618 medical crowdfunding campaigns selected in Step 1 were linked to 1,830 comments. Two researchers first read 500 randomly selected Reddit comments from this pool and came up with the following definition of comments expressing skepticism: 1) explicitly mentions that a campaign is suspicious, 2) asks for more information, clarification, or verification of the information provided in a campaign, and/or 3) points out incorrect or exaggerated information. Thus, the scope of our analysis is the subset of Reddit comments that question the credibility of medical crowdfunding campaign posts.

Two researchers individually coded 800 randomly selected Reddit comments to identify whether each comment was expressing skepticism using the above definition. After two rounds of coding, we achieved a Cohen's kappa coefficient of $k=0.94$. One of the two researchers then coded the rest of the comments and identified 149 Reddit comments expressing skepticism out of the 1,830 Reddit comments. Other comments showed support for the patients and fundraisers, demonstrated empathy, or requested sharing a campaign to other online sites. As shown in Table 1, among the campaign posts that received at least one comment (N=303), 24.4% of them (N=74) received comments expressing skepticism.

Number of crowdfunding campaigns posted on Reddit	All	*Medical only*	Medical with at least *one* comment	Medical with *credibility comments*
GiveForward	367	228	106	29
YouCaring	330	157	75	19
GoFundMe	511	158	94	21
Fundly	181	44	18	3
Life.indegogo	153	31	10	2
Total	1542	618	303	74

Table 1. Total number of 1) crowdfunding campaigns, 2) *medical* campaigns, 3) *medical* campaigns received at least one comment on Reddit, and 4) *medical* campaigns received credibility comments posted on Reddit from each crowdfunding site.

Step 3. Categorizing Comments Criticizing Credibility
To better understand the nature of the credibility concerns surrounding medical crowdfunding campaigns, two of the authors highlighted all the statements in the comments that provided explanations for the criticism. We then coded them using an inductive process [29]. We conducted multiple passes over the codes, refining them until we began to see broader patterns in the data. We discussed the codes between each pass and developed themes. These themes were translated into our categorization scheme to determine credibility factors based on the expressed reason behind the skepticism (see Table 2). We re-read all comments to assign them to a category.

Interviews
We conducted interviews to assess how the credibility factors impact people's perceived credibility of medical crowdfunding. To recruit participants, we posted flyers at various public places and sent emails to local communities. We recruited 20 participants (10 females and 10 males, Mean age = 28.8, SD age = 6.2) consisting of three university staff members, eleven graduate students, three undergraduates, one visiting scholar, and two office workers. All participants had previously observed and considered contributing to medical crowdfunding campaigns. Ten of the participants had not donated to a campaign. Their stated reasons for not having donated in the past included the uncertainty of the campaign's credibility (N=7) and/or the lack of money (N=3). The length of the interviews ranged from forty minutes to one hour. We recorded and transcribed the interviews, and compensated the participants with $10 Amazon gift cards.

Selecting Medical Crowdfunding Campaigns
We selected six medical crowdfunding campaigns to trigger discussions about various credibility factors in the interviews. The selected campaigns contained different combinations of the credibility factors found from our Reddit comment analysis. We used six of the seven Reddit

credibility factors (see Table 2) that we found in Step 3 to select the campaigns. We removed the "Others" category from the selection criteria because it was too general and covered unspecific topics. We balanced all of the credibility factors when selecting the example campaigns, and chose campaigns that were promoted on Reddit in order to focus on campaigns that targeted third-party potential donors. We selected three campaigns involving accidents and three involving medical conditions; these represented the most common funding needs in medical crowdfunding campaigns. Three campaigns were from GiveForward, and the others were from YouCaring, GoFundMe, and Fundly. We report more detailed information about each campaign in the Findings section (see Table 3).

Interview Procedures

To answer our research questions, the interviews addressed each participant's previous experience in medical crowdfunding campaigns and the perceived credibility of the six campaigns we provided. The same researcher conducted all the semi-structured interviews.

We first asked participants about their experience viewing and donating to medical crowdfunding campaigns. If the participant had never donated, we asked him/her to explain why[5]. Then, participants were shown the six medical crowdfunding campaigns. They were allowed to (1) freely explore the campaign's webpage, updates, and donors comments, (2) click on anything on the campaign page such as news article links, pictures, or videos and (3) search for more information on the Internet. Afterwards, they were asked to rate the campaign's credibility on a 5-point scale on a paper (with 1 being the least credible and 5 being the most credible). While participants were browsing each campaign, we asked them to think aloud about the aspects of the campaign that led them to believe or to doubt its credibility. We also asked their criteria for evaluating the credibility of the campaign.

After participants explored all six campaigns, we asked follow-up questions about the credibility factors they mentioned to further understand how they related each factor to credibility. Additionally, if there were factors gathered from Reddit the participant did not mention, we informed them of the factors and asked them if they had considered them. We also asked how they believed these unmentioned factors might affect credibility. We only prompted participants with Reddit factors at the conclusion of each interview to mitigate potential bias. We closed the interview by asking participants for suggestions that could help them to better evaluate the campaign's credibility.

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[5] In line with Gerber and Hui's finding that low credibility in crowdfunding campaigns impedes funding [10], seven out of ten of our study participants who had never donated to a medical crowdfunding campaign, named lack of credibility as the major reason.

Interview Data Analysis

One researcher who did not participate in the Reddit comment analysis conducted the interview data analysis to reduce bias in coding. The researcher thoroughly investigated interview transcripts and iteratively developed a classification scheme for the credibility factors. After the primary categories and subcategories were established, she used NVivo [37], an annotation tool, to classify sections of the interviews. Then a third researcher examined the classified sections to confirm the coding. We then used axial coding to finalize the categories and to derive additional credibility factors that were not mentioned in the Reddit comment analysis.

RESULTS

Through the Reddit comment analysis and interviews, we identified eleven credibility factors in medical crowdfunding campaigns (shown in Table 2).

Credibility Factors

A credibility factor in a medical crowdfunding campaign is a feature that increases or decreases the campaigns' perceived credibility. The preliminary Reddit comment analysis revealed seven key credibility factors; the interviews revealed these same seven factors, and four more, for a total of eleven factors (see Table 2). The resulting Reddit comment analysis percentages are calculated from the total number of comments (N=149) and the interview percentages are calculated from the total number of interview participants (N=20). The following sections describe the factors in detail and the roles they play in evaluating the credibility of a campaign.

Details of External Financial Support

Insufficient and/or incorrect information about external financial support (e.g., insurance) was the most frequently mentioned factor (N=33; 22%) on Reddit and the fifth most frequent in the interviews (N=11; 55%). Both redditors and participants sought information regarding a beneficiary's reception of other financial support such as insurance or government support. Concerned that the fundraiser might collect more money than he or she actually needed, they also wanted to know the exact coverage of external financial resources and the amount of out-of-pocket money.

People asked for more information especially when they had prior knowledge about possible external funding options. For example, many Lyme disease subredditors knew about possible treatments and insurance coverage for the disease and could identify incorrect insurance information in Lyme disease campaign descriptions. Similarly, a redditor asked on a school-based subreddit: *"How does he not have insurance? When I attended, you were required to get medical insurance through the school or had to [...] sign a waiver indicating you had third party insurance. Need more info before I chip in"* (R43).

Factors	Detailed Descriptions
	Examples of comments expressing skepticism regarding each factor

<table>
<tr><td colspan="2" align="center">Seven factors common to the Reddit comments and the interviews</td></tr>
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Factors	Detailed Descriptions / Examples
Details of External Financial Support Reddit: N=33; 22% Interview: N=11; 55%	Both: Checking the beneficiary's insurance coverage, or other financial support resources (e.g., government)
	"[…] As someone who's 17, she should certainly be covered under her parent's medical insurance, at the very least. There are of course costs insurance doesn't cover, but until there's some info it feels sketchy just pouring money into this fund" (R31).
Off-Site Verification Details (for Ailment, Incident, & Treatment) Reddit: N=31; 21% Interview: N=11; 55%	Both**:** Asking for details about the accident, the specific type of medical condition, current stages, possible treatments, and surgeries; verifying whether the beneficiary has the medical condition and/or whether the advocated treatment is necessary.
	"I mean...what is the surgery for? The name of the surgery implies a "cure". There is no cure. I know because I have CMT" (R78).
Realistic Funding Goals Reddit: N=29; 19% Interview: N=17; 85%	Both: Questioning a high monetary goal; requesting itemized budget of how the donation would be spent, Interview: Doubting low goal amount
	"You don't need $1,300 in Thailand to treat it" (R40).
Redundancy in Campaign Description, Multimedia, & External Resources Reddit: N=25; 17% Interview: N=18; 90%	Both**:** Requesting external media sources or references such as pictures, videos, and news articles; checking for consistency between the campaign's description and the external sources.
	"A lot of external links help. I guess it's nice to see a lot of different articles say the same thing" (P8).
Beneficiary Merit Reddit: N=22; 15% Interview: N=3; 15%	Both**:** Blaming the beneficiary for not having insurance; checking for legal and moral liability in the accident, Reddit**:** Pointing out the beneficiary's history or high income
	"Is there any actual proof this guy really has cancer? I mean he did rob a store for drugs - perhaps he (or someone) is trying to scam others. Just a thought" (R17).
Fundraiser and Beneficiary Identity Verification Reddit: N=21; 14% Interview: N=10; 50%	Both: Verifying whether the fundraiser and beneficiary are who they claim to be; warning of a fundraiser-beneficiary mismatch, Reddit**:** Mentioning the possibility of a scammer copying and pasting another's legitimate campaign
	"It is a common scam for a non-affiliated party to hold a fundraiser where all the money lines the scammers pockets" (R9).
Others Reddit: N=8; 5% Interview: N=7; 35%	Both**:** Flagging without a specific reason; questioning a crowdfunding site's reputation; pointing out grammar mistakes
	"If I was going to give money to strangers, I would look into GiveForward because it looks familiar" (P11).

<table>
<tr><td colspan="2" align="center">Four factors unique to the interviews</td></tr>
</table>

Factors	Detailed Descriptions / Examples
Communication between Donors & Fundraisers Interview: N=15; 75%	Interview**:** Posting many detailed updates from fundraisers; organizing offline meetings
	"I think [the fundraisers] should continue updates. Because they said they will use [donations for] some therapy or treatment. There is no feedback to the [donors]. I think update[s are] very important for their donation" (P10).
Presence of Personal Comments Interview: N=14; 70%	Interview: Looking for personal and long comments from donors
	"I do like this support activity portion. [Personal comments] give more credibility because if this [fundraiser] was [a] single person trying to steal money from people, it will be challenging to make all these personal comments, I believe. It will be more work for him" (P20).
Lower Professionalism Expectations Interview: N=12; 60%	Interview: Tolerating incorrect grammar and/or lack of professionalism
	"I don't care about the grammar. Correct grammar is nice and preferred, but that doesn't affect my judgment" (P12).
Appropriate Level of Emotion Interview: N=12; 60%	Interview: Feeling uncomfortable about excessive or insufficient expression of emotion
	"The big issue with [this campaign] is the lack of emotional description. It seems like you're not related to the beneficiary. […] I've doubts on campaigns that don't have the appropriate amount of emotion" (P16).

Table 2. Perceived credibility factors of medical crowdfunding campaigns that are identified in both the Reddit comments and the interviews: "Both" indicates the factors are identified in both Reddit and the interviews. We calculated Reddit results based on the total number of comments, and the interview results based on the number of participants. One Reddit comment could be included in multiple credibility factors if the comment contained several statements about different credibility factors.

Off-Site Verification Details

Redditors and our participants all required more detail about a campaign's cause in order to validate the campaign. Requested details pertained to the specific type of medical condition, a detailed description of the accident, or the expected treatments and surgeries. They also questioned the existence of the beneficiary's ailment or the necessity of the treatments listed in the campaign. Some even searched the Internet regarding the medical conditions or the accidents to garner additional information (9 Reddit comments, 7 participants).

Redditors collectively validated the credibility by exchanging supplementary sources via Reddit's commenting feature. When they found information that was inconsistent with a campaign's descriptions, some redditors reported the information as a caution to others. One Reddit discussion started with the question: *"I was going to donate but got totally thrown off by the 50,000 goal. It seems suspicious"* (R17). Other redditors joined the discussion and shared evidence gathered online. Sharing news articles and confirmation letters from crowdfunding sites are notable examples of a collective validation process: *"I contacted the Fundraiser site last night when I was originally concerned and heard from the company. They say they have contacted the actual beneficiaries (the boy's parents) and that it is indeed legit and are working out how to get them the funds and needs. So yay!"* (R153)

Realistic Funding Goals

Both redditors and participants suspected campaigns with an unrealistically high goal that lacked an explanation. A high monetary goal gave the impression that the fundraiser was trying to profit from the situation and negatively affected their credibility. People often asked for a breakdown of how the donation would be spent instead of accepting an arbitrary goal amount for a general cause. Participants also doubted campaigns that had unrealistically low goals for the same reasons: *"$5,000 is too small [of a] goal amount for cancer. Didn't even describe what they are going to do with this money"* (P15).

Redundancy in Campaign Description, Multimedia, & External Sources

Most of our interview participants (N=17; 85%) validated the campaigns using redundant information reported across the campaign's description, multimedia (i.e., pictures and videos) and external sources (e.g., news articles, Facebook pages, notes from doctors and police). Here, we only refer to multimedia and external sources linked from the campaign page, not the external sources participants and redditors sought out themselves on the Internet.

When participants found information about a campaign to be inconsistent with the campaign's description, multimedia, and external sources, they doubted the credibility of the entire campaign. For example, when the beneficiary's estimated age in photos did not match the text description, redditors requested more recent pictures. Our interview participants investigated the campaigns' photographs thoroughly (e.g., to determine whether the faces in every picture appear to be the same person). They also found that the descriptions of some campaigns did not match the publicly reported news article linked on the medical crowdfunding campaign. For example, the fundraiser in Campaign 2 stated the beneficiary needed $250,000 for the prescribed treatment while a news article reported that the treatment cost $225,000. When participants discovered this discrepancy, they suddenly became very skeptical about the campaign.

Beneficiary Merit

A beneficiary's negative reputation or lack of responsibility led both redditors and participants to reconsider the value of the campaign. Both the Reddit comments (N=22; 15%) and our participants (N=3; 15%) questioned the fundraiser's responsibility when they did not have insurance or did not report who was responsible for the accident.

Some Reddit comments (N=9; 6%) pointed out the beneficiary's fraud history and/or high income. Redditors sometimes knew about the beneficiary's personal information because subreddits are formed around common interests or places. For example, redditors in a musical band's subreddit knew one band member's scam history and his high income. When this band member initiated a campaign with a high goal amount, redditors suspected his intentions to solicit money via crowdfunding.

Fundraiser and Beneficiary Identity Verification

Redditors and participants verified the beneficiary's and the fundraiser's identity through various means. Participants (N=10, 50%) explained that any social media account linked to names of the beneficiary or the fundraiser added to the credibility of a campaign: *"I think posting videos after you upload [a video to promote the campaign] and you keep using this account [sic] … that tells something. If it were fraud, you will probably abandon this account"* (P11). Newly created accounts to promote the campaign received criticism and spawned requests for additional verifying information. To verify the legitimacy of a beneficiary without linked social medial accounts, participants searched for fundraisers' names on the Internet to locate their Facebook, Twitter, or LinkedIn accounts. Warkentin et al. named these real-world identity to online identity links *warrants* [31] and found that using real-world identities reduces deception in the online environment. Three of our participants stated that they generally perceived LinkedIn information as more credible than Facebook or Twitter information.

The crowdfunding sites we investigated allowed anyone to create a campaign on behalf of a beneficiary. When the fundraiser was not the beneficiary, participants asked why the beneficiary him/herself did not create the campaign or at least contribute in the updates. One participant commented, *"It's only about her aunt. No word from [the beneficiary] herself or family"* (P11). Many participants

(N=11, 55%) also raised questions about the actual relationship between the fundraisers and the beneficiary if the site provided no explanatory information.

Redditors wanted to verify whether the collected funds actually went to the beneficiary. For example, they requested a handwritten note from the beneficiary or a Facebook account so that they could contact the beneficiary directly. Further, even if the fundraiser claimed that she or he was the beneficiary, redditors mentioned that some scammers often copied-and-pasted legitimate campaigns: *"The problem I've noticed is that there are seemingly legitimate charity-crowd-funding sites that are popping up with seemingly legitimate causes. Then, scammers copy-and-paste the charity to their own crowd-funding sites. [...] So, buyer (or giver) beware"* (R56).

Others
Uncategorized comments on Reddit included those that flagged a campaign as suspicious without a specific reason. Four participants checked the funding goal completion rate of campaigns (N=4; 20%). Although participants acknowledged that campaigns might have low funding goal completion rates due to multiple reasons, such as poor publicity, they still perceived those campaigns as less credible compared to the ones with higher completion rates. The good reputation of the crowdfunding site such as GiveForward and GoFundMe also played a positive role in a campaign's perceived credibility. Some participants (N=4; 20%) viewed sites without a lock symbol in the browser's address or a logo at the top of the page as "sketchy." They sometimes questioned the site's campaign screening procedures and performed Internet checks to determine whether the site had a history of scam campaigns.

All of the above factors appeared in both the Reddit comment analysis and our interviews. The remaining four credibility factors only emerged in the interviews and referred to communication and emotions.

Communication between Donors and Fundraisers
Participants perceived regular updates as an indicator of the fundraiser's commitment, responsibility, and appreciation of the donors. Our participants reported campaigns as "highly suspicious" when they had zero to three updates. The inactive campaigns might convey the impression that the fundraiser only coveted donors' money and had abandoned the project after acquiring it. Participants (N=6; 30%) mentioned that regular updates raised the perceived credibility of a campaign because accumulated updates over time showed the fundraiser's engagement and commitment to the campaign. Participants especially valued updates that reported the success of treatment or surgery by virtue of the medical crowdfunding campaign. P10 even commented that he would be willing to give an additional donation if necessary because of one such positive update. Xu et al. similarly found that updates significantly impacted success rates in Kickstarter campaigns [20]. While they did not directly assess credibility, we believe their findings parallel ours and that updates act as a signal of credibility.

Presence of Personal Comments
Participants (N=14; 70%) looked for existing relationships between the donors and the fundraiser through personal comments. The personal comments included mentioning the beneficiary's nickname, describing the beneficiary's personality, or shared experiences with the beneficiary. Such comments reveal the existence of an authentic personal relationship between the donors and the beneficiary. The fact that people who actually know the beneficiary donated money verifies the legitimacy of this campaign. For similar reasons, participants considered donors who provided real names, affiliations, Facebook accounts, or profile pictures as particularly helpful in evaluating the campaign's credibility.

Lower Professionalism Expectations
Three comments on Reddit (2%) identified incorrect grammar in the campaign description as a cause for concern. However in the interviews, incorrect grammar only led to decreased credibility when it appeared careless. Most of our participants tolerated incorrect grammar (N=12; 60%). P1 stated, *"Your level of education and your ability to write has no bearing on the right to your medical care and need for financial assistance. In fact, if you can't write a complete sentence or use correct grammar, you probably have fewer resources and people in your life who have money to give."* Somewhat surprisingly, some participants (N=4; 20%) even saw unprofessionalism as a sign of credibility. One participant asked, *"If you are so emotional and in a sad situation, how can you have time to make such a good video? [A] high quality video seems sketchy"* (P15).

Appropriate Level of Emotion
Participants (N=9; 45%) reported skepticism of campaigns that displayed excessive or insufficient emotion. They felt that campaigns laden with emotional content signaled a disingenuous intent to amplify empathy. Participants wanted to be convinced through rational appeals (i.e., facts) rather than by emotional appeals (i.e. narrative). Using words such as "innocent child" and "best Christmas gift" was deemed as unnecessary, too dramatic, and/or exaggerated by some participants (N=5; 25%). One participant commented that he had seen many scam campaigns that followed *"a template with a sad tone, very emotional [...] It's mostly about women with kids who don't have a partner, which is fishy. Her husband left her, she doesn't have a job and has to take care of a child [... Stories about] kids and teens are very common as well."* Whenever a campaign followed one of these patterns, he found it very suspicious and requested more detailed facts that could ameliorate his doubts.

Conversely, participants perceived lack of emotion as inappropriate for medical crowdfunding campaigns. *"Sounds so weird. 'Extricated' is not a word someone would use when they talk about a loved one. It's a medical*

or science term. The rest of paragraph is still written as if they are talking about this distant person. It's very off-putting" (P16).

Summary of Credibility Ratings

As shown in Table 3, the three campaigns (2, 3, and 6) that contained the redundancy factor received the highest credibility ratings. Notably, our participants perceived Campaign 3 as most credible (see Table 3); it presented a variety of external sources such as a magazine article, news article, and links to pictures on Facebook. The consistent information presented across multiple sources was the most important criteria for evaluating the campaign's credibility. Campaign 6 was rated as the second most credible. Many updates (10 updates) describing details about the beneficiary's surgery procedure and her status after the surgery added credibility to this campaign. Campaign 2 was not perceived as credible as Campaigns 3 and 6 due to the uncertainty of how the donation was used. Although the campaign had reached its goal, the beneficiary had passed away before receiving the surgery. Participants wondered what the fundraisers did with the donations.

The other three campaigns (1, 4, and 5) did not have external sources or a sufficient number of updates. Campaign 1 had three updates, but one of the updates contained inconsistent insurance information. Our participants also heavily criticized the fundraiser's unclear relationship with the beneficiary and the lack of detail when describing the beneficiary's situation. P13 said, *"Campaign 1 makes me think they are targeting third-party members and I felt they are trying to take advantage of me."* Campaign 4 and 5 did not have any updates or external sources. Participants particularly marked Campaign 5 as the least credible because the fundraiser provided his personal bank account so that donors could pay him directly instead of using the official crowdfunding website.

DISCUSSION

Our results suggest that a variety of factors impact the perceived credibility of medical crowdfunding campaigns. In this section, we compare our credibility factors with those previously found in other online platforms including entrepreneur crowdfunding. We highlight three major differences: the presence of personal comments, the appropriate level of emotion, and the lower expectations of professionalism. These communicative/emotional credibility factors were unique to our study, and we explain their connection to the social nature of medical crowdfunding campaigns. Then, we explain the importance of endorsements from the beneficiary's close-connections. We conclude by suggesting how the community's collective online presence can be used to increase a campaign's perceived credibility.

Reasoning, Communicative, and Emotional Factors

Credibility has two key components: trustworthiness and expertise [7]. In contrast to entrepreneur crowdfunding credibility that relies on *expertise* in making products [6],

Credibility Factors	Campaigns					
	1	2	3	4	5	6
Financial Support	•		•	•		
Off-Site Verification Details	•		•			•
Realistic Funding Goal			•			•
Redundancy		•	•			•
Beneficiary Merit		•	•		•	•
Identity Verification		•				•
Communication	•	•	•			•
Personal Comments	•		•			•
Professionalism		•	•			•
Appropriate Emotion			•		•	•
Average Rating	3.1	4.1	4.7	2.8	1.7	4.5

Table 3. Credibility factors contained in our interview campaigns: the dots indicate that a campaign contains the corresponding credibility factor. Campaign 1 (C1) a GiveForward campaign for a baby boy with a rare form of cancer; (C2) a YouCaring campaign for a middle-aged male with a rare form of leukemia; (C3) a GoFundMe campaign for a middle-aged male hurt in car accident while riding a bike; (C4) a GiveForward campaign for a middle-aged female with brittle bone disease hurt in a car accident while driving; (C5) a Fundly campaign for a middle-aged male with a brain tumor; (C6) a GiveForward campaign for a middle-aged female hit by a car while walking.

medical crowdfunding credibility focuses on the *trustworthiness* of the medical situation. Our study identified new communicative/emotional factors as a proxy for verifying the beneficiary's medical condition. Although numerous entrepreneur crowdfunding studies [14,15] found that the beneficiary's social capital (e.g., number of friends on Facebook) relates to the success of a campaign, we additionally identified personal comments as a strong credibility signal of medical crowdfunding campaigns. Personal comments that expressed deeply felt concerns for the beneficiary's medical condition and/or provided descriptions of shared history with the beneficiary signaled genuine relationships between the donor and the beneficiary. In contrast, entrepreneur crowdfunding donors mainly used the commenting feature to request more information about the product [10], not to have a personal conversation with the beneficiaries. An appropriate level of emotion also played an important role in the positive assessment of a campaign's credibility because people perceived emotional responses in the context of medical situations to be natural. However, an emotional appeal without any logical reasoning may decrease the perceived credibility.

Some of the credibility factors identified in our study closely relate to factors of online information credibility [19,25]. Credibility factors for information within websites

include 1) author identification and qualification, 2) external links to reputable sites, 3) comprehensiveness, 4) plausibility of information, and 5) professional quality and clear writing. While our study found factors similar to the first four of these credibility factors, our factors emphasize the personal nature of medical crowdfunding: 1) fundraiser and beneficiary identity verification and beneficiary merit, 2) redundancy in campaign description, multimedia, and external resources, 3) details of external financial support and offsite-verification details, and 4) realistic funding goals (refer to Table 2).

We found key differences in the fifth factor, professional quality and clear writing. Although non-standard grammar was associated with low credibility in tweets [22], online websites [8] and low success in entrepreneur crowdfunding [21], most of our participants tolerated incorrect grammar (N=12; 60%), often attributing it to the difficulty of the fundraiser's situation.

Collective Endorsements

Compared to previous organization-based charitable fundraising, crowdfunding puts the burden of establishing credibility on the fundraiser. Organizations could afford third-party validation [11] or celebrity endorsements [16], but these types of endorsements are difficult to obtain for an individual fundraiser.

Instead, our results show that individual fundraisers can leverage their *collective endorsements* to signal their credibility. We define collective endorsements as the collection of personal messages from people appearing to be close friends on the public campaign page (whose identities are linked to a social media site) and the online community discussion threads describing that campaign.

As an example, most interview participants (N=18; 90%) pointed out community credibility signals in the campaigns, such as personal comments from the beneficiary's or fundraiser's acquaintances, the presence of a fundraising *team*, and updates acknowledging supporting communities and donors around the beneficiary. Participants interpreted these close-connection endorsements as strong validation of the campaign. P7 stated, *"[the beneficiary's] friends and coworkers and fellow bikers post[ed] for him on his behalf. When you have people speaking up on your behalf, then [that] definitely adds a lot of weight to the story"* (P7). P16 added, *"just because this is something that other people have looked into, it seems valid."*

Campaign 3 exemplifies the power of close-connection endorsements. The fundraiser publicly acknowledged supportive communities and donors by name (bicycling community or coworkers) and expressed gratitude. The fundraiser further described how each community helped the beneficiary such as resolving the beneficiary's insurance problems, advertising the campaign, and organizing meals for those staying with the beneficiary in the hospital. Furthermore, this campaign's update

mentioned an offline meeting between the beneficiary and the donors. The offline meeting presented an opportunity for third-party donors to meet the fundraiser and the beneficiary face-to-face. This also aligns with 6 participants' common view that donors should not be seen solely as a source of money but rather as a supportive community for the beneficiary.

Similarly, we found that the Reddit credibility discussions provided useful information for other potential donors. When one redditor questioned the credibility of a campaign posted on Reddit, distributed redditors responded and provided evidence found online. Such discussion threads establish a repository of collective validation signals, and potential donors can use this resource to evaluate the campaign's legitimacy.

Overall, we found that participants perceived campaigns with redundant information across various sites as more credible. The collective endorsement becomes another redundancy signal; the beneficiary's repeated message endorsements from close connections collectively promote the campaign online. This powerful collective presence distinguishes online medical crowdfunding from traditional charitable fundraising and hints at credibility metrics to come in medical and non-medical domains.

LIMITATIONS

One limitation in this study is the limited number of participants. A wider demographic of subjects could identify a greater variety of credibility factors. Our interview setting may have biased the participants to ponder the campaigns more skeptically than in their natural setting. In addition, Reddit comments may be biased because every subreddit has a different activity level, demographic, and culture. Finally, our study focuses on a *perceived* credibility of the campaign rather than the actual.

CONCLUSION

In this study, we examined factors associated with perceived credibility in medical crowdfunding campaigns. Our work offers two contributions. First, we identified eleven credibility factors. Our results included three novel communicative/emotional factors that distinguish medical crowdfunding credibility assessment from credibility assessment in other online media. Second, we examined the practice of *collective endorsements* where the perceived credibility of a campaign can be evaluated through personal messages, redundancy across various sources, and online community discussions. These findings can help fundraisers form online "watchdogs" for their campaigns by leveraging their close-connections' online presence and existing online communities.

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