Will a digital camera cure your sick puppy? Modality and category effects in donation-based crowdfunding

Larry Zhiming Xu

Annenberg School for Communication and Journalism, University of Southern California, 3502 Watt Way, Los Angeles, CA 90089, USA

ARTICLE INFO

ABSTRACT

Project descriptions in donation-based crowdfunding are supposed to give a full account of the incidents and help compensate for the lack of social cues, on which donors rely to judge if donations are worthwhile. The study examines three common communication modalities in project descriptions, including video, picture, and text, in terms of their effects on crowdfunding outcomes. Using webpages of a major crowdfunding platform ($N = 4123$), the author found that only a limited number of projects leveraged the benefits of embedding videos and pictures. Although having more videos and pictures generally predicted an increase in donation, the increase was unevenly distributed across different categories of projects. Meanwhile, topic modeling distinguished word clusters from description texts. While a variety of topic words relating to factual details positively predicted the fundraising outcomes, clusters featuring the overuse of requesting words such as "help", "money", and "thank" seemed to backfire. The findings shed light on the complex contingencies of communication modality effects across different types of projects and provide guidelines for more effective message design in crowdfunding campaigns.

1. Introduction

As a novel and noteworthy fundraising model, crowdfunding in recent years has continued to spread and flourish all over the world. For example, roughly one out of four Americans has participated at least once in crowdfunding (Pew Research Center, 2016), in which small funds are collected from a large number of contributors. While in some projects funders are compensated with benefits such as discounts or early access to new products, in donation-based crowdfunding rewards are typically not provided. From overcoming medical crises to rescuing homeless animals, eliminating community problems to reallocating educational resources, donation-based crowdfunding covers an incredibly broad spectrum of topics. As a distinctive problem-solving strategy and a widespread social practice, donation-based crowdfunding has become an alternative source of capital for a variety of personal and public purposes.

Despite its expanding scope and profound influence, research examining the dynamics of donation-based campaigns is much scarcer compared to that of their for-profit counterparts. Specifically, both conceptual work and empirical evidence are meager in delineating the unique landscape of this emerging social phenomenon, as well as the practice-wise processes through which fundraisers use different tools afforded by the platforms to persuade donors. To reduce the gaps in literature, the current study aims at explicating the mechanisms and dynamics of donation-based crowdfunding, with particular regard to the use and effects of communication modalities in project descriptions. Although existing studies have examined the effects of video, picture, and text modalities embedded in project descriptions (e.g. Dey et al., 2017; Feldmann and Gimpel, 2016; Koch and Siering, 2015; Mitra and Gilbert, 2014; Mollick, 2014; Xu et al., 2014), insufficient attention has been paid to demonstrating the complex contingencies of the

effects across different categories of crowdfunding projects. Hence, apart from examining the modalities of message delivery, the study will also delve into the possible interactions between modality and category effects in donation-based crowdfunding to showcase if modality effects can apply across the board. By identifying categories in which certain modality configurations are especially conducive (or detrimental) to persuasive attempts, the study will provide practical guidelines for more efficacious message design in nonprofit crowdfunding campaigns.

2. Literature review

2.1. The rise of donation-based crowdfunding

Regardless of sharing the same title, crowdfunding campaigns differ in goals, and, consequently, routes through which the goals are attained. As one of the widely used typologies provided by Belleflamme et al. (2014), projects can be categorized as equity-, reward-, and donation-based. In equity- and reward-based projects, contributors (commonly referred as backers or funders) are compensated with financial or non-financial benefits to incentivize or repay their giving, whereas in donation-based projects contributions are usually detached from any kind of benefits in return. Although nonprofit campaigns disperse in more than 2000 global platforms (Drake, 2017), there are online communities that specialize in donation-based crowdfunding (e.g. GoFundMe, Crowdrise, Kiva). In 2017, Facebook launched "Fundraisers", an internal tool allowing users to raise money for nonprofits, which is expected to further expand the frontiers of this already pervasive fundraising mode given its 2.2 billion active users worldwide (Statista, 2017; Yurieff, 2017).

The social causes leading to the recent rise of donation-based crowdfunding are diverse but generally related to the unfulfillment of public services or underprovision of public goods (Davies, 2015). Wash and Solomon (2014) maintain that donation-based campaigns almost always involve some civic and public good components being funded, such as education (Colgren, 2014) and journalism (Jian and Usher, 2014), thus offering financial and social support to individuals and communities that can hardly seek help elsewhere. Wash (2013) argues that since crowdfunding often yields the same outcomes as raising capital from other sources, it has the potential to be a powerful supplement to, if not a replacement of, the undermined public sector. During community disruptions, such as Flint water crisis in Michigan in which governmental actions are delayed or absent, crowdfunding has been playing an important role in providing resources and services to the residents in time (Garcia, 2016). When struck by serious illness, more individuals who have little or no insurance resort to crowdfunding to tackle the crippling burden of medical costs (Jopson, 2018). With a wide array of charitable purposes realized more effectively and efficiently, Özdemir et al. (2015) believe that donation-based crowdfunding is changing the landscape of traditional philanthropy due to its participation mode and extensive reach. Aligned with the models of individual charitable giving and social entrepreneurship, donation-based crowdfunding achieves old goals through new means (Frydrych et al., 2014; Meer, 2014).

Compared to conventional, loosely-structured nonprofit fundraising campaigns, donation-based crowdfunding projects have concrete, well-defined guidelines and dynamic information to keep the participants up to date (Wash, 2013). As donations rarely go offline, the cues available online are critical for decision-making. From a social information processing perspective (Walther, 1992), it is these online cues that help compensate for the lack of the face-to-face interactions in traditional charitable fundraising. Existing research has examined the influence of a wide range of supplemental cues embedded in online project listings, including goal, fund received, time frame, geographic location, number of donors, social media connection, sharing, user commenting, and project updating, to name a few (Agrawal et al., 2013; Kuppuswamy and Bayus, 2013; Lu et al., 2014; Mollick, 2014). Together, the cues help legitimize fundraising attempts and promote participation while eliminating dubiety and providing social proof (Gerber et al., 2012). However, compared to these supplemental cues, project description as the central element of listing has received inadequate attention (e.g. Anderson, 2016; Huber, 2014; Kahl, 2015; Manning and Bejarano, 2017; Zheng et al., 2014). Despite some empirical findings (e.g. Dey et al., 2017; Koch and Siering, 2015; Mitra and Gilbert, 2014; Mollick, 2014), insufficient work has been conducted to systematically examine how the components of project description, such as modality cues (video, picture, and text), facilitate or hinder crowdfunding initiatives.

2.2. Modality effects in crowdfunding

Communication modality refers to the specific format of message delivery, such as text, picture, audio, or video (Chaiken and Eagly, 1983). Although the term "modality" is often interchangeably used with analogous concepts such as "mode", "medium" and "channel", Sundar (2008) specifies modality as a structural affordance present in digital media that conveys cues to trigger information processing heuristics. By his definition, modality embodies more than the physical channel through which information is transmitted; it is highly functional in engendering a chain of visceral reactions on both physiological and psychological levels. Thus, the structural characteristics innate in different modalities may well cultivate diversified information processing patterns of the same message, possibly leading to contrasting outcomes (Chaiken and Eagly, 1976).

Communication modality has been viewed as a key determinant of persuasion (Chaiken and Eagly, 1983). For decades, the persuasiveness of specific modalities, such as video, picture, and text, have long been explored but only yielded mixed if not contradictory results, with little definite proof of the persuasive superiority of any modality (e.g. Cantril and Allport, 1935; Kim et al., 2011; McGinnies, 1965; Pfau et al., 2000). The impact of modalities is further complicated by their interactions with message content and characteristics (Chaiken and Eagly, 1976; 1983). As of viewing crowdfunding as a novel persuasive attempt (Anderson, 2016; Dey et al., 2017; Murray et al., 2015; Tenca, 2015), scholarly interests are growing on examining the use and effects of video, picture,

and text modalities embedded in project descriptions, and likewise, the studies (e.g. Dey et al., 2017; Feldmann and Gimpel, 2016; Koch and Siering, 2015; Mitra and Gilbert, 2014; Mollick, 2014; Xu et al., 2014) have produced somewhat mixed findings.

2.2.1. Video and picture

Videos and pictures have been hailed as more powerful psychological cues and, therefore, more effective storytelling tools than text-only messages (Appiah, 2006; Gubrium and Holstein, 2008; Kim et al., 2011; Sundar, 2000). In crowdfunding, videos and pictures are both found to play an important role in persuasive appeals (Mollick, 2014; Wheat et al., 2013). Possible reasons leading to the effects are also discussed. For instance, Koch and Siering (2015) suggest that some crowdfunding messages can be better transmitted by "rich media" like videos and pictures that can handle multiple information cues simultaneously (Daft and Lengel, 1986). Feldmann and Gimpel (2016) argue the adding of videos and pictures signals high quality of the campaigns and the preparedness of the fundraisers, hence increasing the likelihood of crowdfunding success. The additions of videos and pictures, albeit optional, are often recommended by platforms and consultants because they are believed to deliver the overall project ideas more effectively. Kickstarter, a major crowdfunding website, explicitly states to the users that "A lot of your story can be conveyed with words, but there's more to a good project page than text. Images and video are a huge help for bringing people inside your story" (Kickstarter Creator Handbook, 2017). Therefore, it stands to reason that the use of videos and pictures may enhance the effectiveness of messages, leading to more desirable fundraising outcomes. *H1* and *H2* are proposed to evaluate the positive effects of videos and pictures on donations.

H1: Having more videos embedded in descriptions will positively predict donations.

H2: Having more pictures embedded in descriptions will positively predict donations.

2.2.2. Description text

Compared to video and picture, text seems to be a more rudimentary modality because of the lack of sensory elements, but as an essential component of project description it is almost always required by crowdfunding platforms for fundraisers to describe the reasons for fundraising, specific needs, and the progress of the projects. Scholars (Allison et al., 2015; Anderson, 2016; Etter et al., 2013; Manning and Bejarano, 2017; Mitra and Gilbert, 2014; Yuan et al., 2016) have also studied description texts in terms of the effects of language styles, storytelling narratives, and terminologies on crowdfunding outcomes. From example, Allison et al. (2015) found in the context of prosocial microloans that framing the appeal as an opportunity to help others outperformed framing it as an opportunity to gain financial benefits. Manning and Bejarano (2017) compared two time-specific storytelling narratives: "ongoing journeys" versus "result-in-progress" in regard to the perceived values of projects; they found that the use of both narratives would contribute to the success if used coherently. Through content analysis of projects on Indigogo, Anderson (2016) found the mentions of need, children and victim terminology have a significant impact on funding success rates for non-profit lending requests. In contrast to human coding and content analyzing that are often subjectively performed, some studies have started to apply text mining techniques, attempting to systematically extract text elements as predictive analytics of fundraising success (e.g. Mitra and Gilbert, 2014; Yuan et al., 2016). In line with this new research stream that uses automated classifiers to produce replicable results on large-scale of data, the first research question is raised to explore the possible relationship between description text and donation, aiming to identify text patterns that are beneficial or adverse to fundraising.

RQ1: What text elements are associated with donations?

2.3. Category effects in crowdfunding

Most crowdfunding platforms provide pre-determined "categories" (such as medical, education, community, etc.) in an effort to label and classify campaigns by topics. The list of categories can serve as a functional index for users to navigate a certain type of campaigns quickly, thus maximizing the likelihood of similar projects to be found and funded. Researchers have noticed that fundraising outcomes are likely to vary simply by project category (e.g. Borst et al., 2018; Briggman, 2014; Dey et al., 2017; Mollick, 2014). For example, Mollick (2014) reported that Kickstarter music projects were almost twice more likely (59.7%) to reach fundraising goals than fashion projects (31.0%). Furthermore, scholars have observed that that category effects may interact with modality effects such that in some categories certain modality configurations are more effective than in others. Recent examples include Dey et al. (2017) who found in different categories of projects that the use of videos produced uneven effects on fundraising outcomes. The differences are attributed to the characteristics of different categories, such as popularity of the topics, complexity of the messages, relevance to the donors, and urgency of the projects (Aprilia and Wibowo, 2017; Berliner and Kenworthy, 2017; Mollick, 2014). Therefore, the second set of research questions are raised to better delineate the contingencies of *H1*, *H2*, and *RQ1*, in terms of how the effects of video, picture, and text vary by category.

RQ2a: Do the effects of text elements (*RQ1*) differ in various categories of projects?

RQ2b: Do the effects of videos (*H1*) and pictures (*H2*) differ in various categories of projects?

3. Method

3.1. Data retrieval and measurement

Exempted by the Institutional Review Board (IRB) at the author's university, the study uses publicly available webpages of a

Table 1
Correlations of key variables.

	1	2	3	4	5	6	7	8	9	10
TD	–	–	–	–	–	–	–	–	–	–
AD	.20[***][1]	–	–	–	–	–	–	–	–	–
Videos	.09[***]	.06[***]	–	–	–	–	–	–	–	–
Pictures	.04[*]	.006	.05[**]	–	–	–	–	–	–	–
Time	.06[***]	.08[**]	.04[**]	−.04[**]	–	–	–	–	–	–
Goal	.04[*]	−.005	.02	−.004	.001	–	–	–	–	–
Favorite	.80[***]	−.02	.07[***]	.06[***]	.02	.03[*]	–	–	–	–
Update	.19[***]	.03[*]	.05[**]	.02	.28[***]	.00	.19[***]	–	–	–
Facebook	.06[***]	−.05[**]	.08[**]	.05[**]	.003	.006	.07[***]	.02	–	–
Sharing	.48[***]	−.01	.05[**]	.08[***]	.01	.009	.54[***]	.24[***]	.10[***]	–
M	4037.38	69.47	.08	.73	110.38	–[2]	56.03	2.97	744.10	318.51
SD	11696.94	80.38	.33	2.11	287.39	–[2]	186.61	6.52	812.78	681.86

Note: 1. [*] = $p < .05$, [**] = $p < .01$, [***] = $p < .001$; 2. The maximum of goal was 500 million dollars, making reporting the mean and SD meaningless. The mean was 196,010.83 whereas the median was only 5000.

major donation-based crowdfunding platform. On April 18, 2016, a total of 4131 project pages were retrieved, from each of which the following variables were obtained, including project description text, category, goal of fundraising, donation received, fundraiser's number of Facebook friends, number of social media sharing, elapsed time since campaign initiation, number of "Favorite" (similar to Facebook's like button), number of updates, as well as numbers of videos and pictures embedded in project description.

One thing should be noted is the operationalization of the fundraising outcomes. As a form of collective action, the outcome of crowdfunding is usually marked by the overall revenue a project can attract (e.g. Mollick, 2014). Nonetheless, according to recent findings, only focusing on the totals may overlook the different approaches through which the fund is collected. Based on an analysis on over 10,000 projects of different types, Xu (2015) suggests that apart from looking at the total amount of donation (TD), it is also important to check the average amount of donation per donor (AD), because TD can be raised by either having more donors participating, or having each donor contribute a higher AD. In the follow-up study (Xu and Ge, 2016), while some of the projects received significantly higher TDs than others, their ADs did not similarly increase, and vice versa. Therefore, both TD and AD will be treated as the dependent variables.

Table 1 shows the descriptives and correlations of the variables. On average, the TD in the sample was 4037.38 US dollars (SD = 11,696.94) and AD was 69.47 dollars (SD = 80.38). Eighty-five percent of the projects did not have any video throughout; sixty-five percent of the projects did not have any pictures embedded in descriptions. All variables were positively associated with TD, whereas only a handful of variables were positively correlated with AD, including the number of videos, the number of updates, and elapsed time since campaign initiation.

Projects from nine categories as determined by the website, were retrieved, including "Accident-Personal-Crisis", "Animals-Pets", "Babies-Kids-Family", "Community-Neighbors", "Education-School-Learning", "Funerals-Memorials-Tributes", "Medical-Illness-Healing", "Non-Profits-Charities", and "Volunteer-Service". Table 2 shows the group comparisons of TD, AD, and funding goal across categories.

3.2. Topic modeling

Topic modeling is a machine learning technique that uses computational algorithms to distinguish latent topics from the corpus (Wallach, 2006). The method would be an appropriate tool to systematically extract predictive elements from the large set of description texts in the study. A popular algorithm of topic modeling is latent Dirichlet allocation (LDA), a three-level hierarchical Bayesian model that provides probabilistic estimations of words on topics, and topics on documents in the corpus (Blei et al., 2003). Hence, the probabilities of the occurrences of the topics in the documents can be used as independent variables in regression models to predict document-wise outcomes. In this case, the amount of donation will be regressed on the topic probabilities of each description text.

A series of LDA were performed using TACIT, a natural language processing program developed by Dehghani et al. (2017). The study reports results from LDA with k (number of topics) = 20 in each category of projects.[1] In order to ease interpretation, the corpus was pre-processed to remove common "stop words" such as prepositions, articles, and auxiliary words. The topics were also post-processed by removing occasional human names occurring in the topics.

4. Results

H1 and *H2* postulated that having more videos and pictures embedded would increase the amount of donation. Table 3 shows

---

[1] Although studies such as Arun et al. (2010) have demonstrated researchers' attempt in finding the "correct" k number in LDA, there has not been a golden rule regarding what is the best k number in LDA algorithm. The selection of k = 20 was based on comparisons with other k numbers that yielded fewer meaningful topics or more redundancy, and consultation with field experts.

Table 2

TD, AD and funding goal across categories.

	TD		AD		Goal[1]	
Category	M	SD	M	SD	Med	5% TM
Accident-Personal-Crisis	3394.45	330.52	74.69	2.73	5000.00	10855.67
Animals-Pets	3162.50	700.78	45.35	1.30	3000.00	5167.69
Babies-Kids-Family	3004.70	329.37	91.99	5.30	5000.00	9171.48
Community-Neighbors	3959.43	595.03	85.30	8.44	4000.00	14789.53
Education-School-Learning	2532.71	627.26	63.44	2.39	4000.00	7120.36
Funerals-Memorials-Tributes	5452.43	340.56	69.95	1.64	6000.00	8357.24
Medical-Illness-Healing	9696.53	765.88	82.81	2.68	10500.00	5295.30
Non-Profits-Charities	2406.60	362.83	62.53	2.78	4000.00	8661.42
Volunteer-Service	2518.04	472.74	54.92	1.90	2500.00	4398.24

Note: 1. As the maximum goal was 500 million dollars, reporting means and SDs is less meaningful than reporting medians and 5% trimmed means.

Table 3

The effects of videos and pictures on fundraising outcomes.

	Model 1 (DV = TD[1]) N = 4129			Model 2 (DV = TD) N = 4129			Model 3 (DV = AD[2]) N = 4124			Model 4 (DV = AD)N = 4124		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Constant	3649.97***[3]	197.29		749.43***	165.16		68.14***	1.36		69.48	1.89	
Modality												
Videos[4]	2991.86***	553.27	.08***	878.85**	334.59	.03**	14.34***	3.81	0.06***	14.76***	3.82	.06***
Pictures[5]	175.44*	86.18	.03*	−97.82	52.03	−.02	.13	.59	.003	.39	.59	.01
Controlled												
Time				1.15**	.40	.03**				.02	.005	.08
Goal				.000	.000	.008				−.000	.000	−.000
Favorite[6]				47.44***	.70	.76***				−.008	.008	−.02
Update[7]				49.83**	18.04	.03**				.13	.21	.01
Facebook[8]				.002	.14	.000				−.005**	.002	−.05**
Sharing[9]				1.09***	.19	.06***				.000	.002	−.003
F	17.24***			926.39***			7.15***			7.03***		
R²	.008			.64			.003			.01		

Note: 1. TD = Total Donation; 2. AD = Average Donation per Donor; 3. * = $p < .05$, ** = $p < .01$, *** = $p < .001$; 4. Number of videos embedded in the description; 5. Number of pictures embedded in the description, excluding the required theme picture; 6. Number of "Favorites" as voted by the website users; 7. Number of updates in the description; 8. Number of Facebook friends that the fundraiser has; 9. Number of social media sharing, including Facebook and Twitter.

results from four nested ordinary least squares (OLS) regression models. In Model 1, both "Videos" (the number of videos embedded in a project description) and "Pictures" (the number of pictures embedded in a project description) were found to positively predict TD. However, "Videos" was a more powerful predictor than "Pictures": having an additional video embedded will predict an average revenue increase of almost 3000 dollars, in sharp contrast with that of an additional picture, which will only produce an average increase of 175 dollars.

In Model 2, controlled variables were added. Whereas "Videos" still positively predicted the outcome, "Pictures" failed to affect revenue; its effects were also suppressed by other variables. The number of favorites voted by the website users, elapsed time, the number of updates written by the fundraiser, along with the number of shares, accounted for most of the variance in the model.

In Model 3 where the dependent variable was replaced by AD, the number of videos was still a more reliable predictor of the outcome than did the number of pictures. Similar results are shown in Model 4 in which confounds are controlled. To summarize, having more videos embedded would raise TD and AD, whereas having more pictures embedded—whilst helping raise TD—would not be particularly beneficial to elevating AD. Therefore, *H1* (video effects) was fully supported, and *H2* (picture effects) was partially supported.

RQ1 was raised to investigate the relationship between description texts and donation. Subsequently, *RQ2a* asked if the relationship would be influenced by category. To answer *RQ1* and *RQ2a*, a series of LDA analyses were performed. Table 4 lists LDA results showing positive and negative topics in each category that statistically significantly predict donation in regression models. Whereas in all nine categories there were positive topics, only in three categories ("Accident-Personal-Crisis", "Funerals-Memorials-Tributes", "Medical-Illness-Healing") negative topics were found. All of the negative topics seem to be characterized by the overuse of fund-requesting words, such as "help", "money", "please", "need", and "thank". Compared to the negative topics, the positive topics incorporate more factual details. For example, in "Medical-Illness-Healing", a factual cancer-related topic is identified (Topic 4: cancer, treatment, tumor, brain, chemotherapy, radiation, diagnosed, found, treatments, aggressive, months, spread, tumors, news, biopsy, scan, chemo, results, lymph), which apparently details the illness conditions and treatment plans. The complete set of positive

Table 4

LDA results across all categories.

Categories	Positive Topics	Negative Topics
Accident-Personal-Crisis	**Topic 10** ($b = .12$, $p = .02$) camper, shelter, animals, owner, tiny, dog, short, say, can't, night, campground, helpless, tears, beach, tools, sold	**Topic 4** ($b = -.009$, $p = .04$) help, can, will, home, family, get, time, need, back, now, us, money, thank, just, life, know, years
Animals-Pets	**Topic 2** ($b = .29$, $p < .001$) dogs, cats, shelter, rescue, care, animals, donations, us, homes, hope, one, food, medical, continue, puppies **Topic 5** ($b = .22$, $p < .001$) sanctuary, chimpanzees, provide, funds, wild, coast, new, care, ivory, research, NYBC, campaign, years American, center, Africa	
Babies-Kids-Family	**Topic 0** ($b = .35$, $p < .001$) adoption, us, God, home, journey, child, adopt, family, adopting, love, process, costs, China, prayer, part, months, agency, adopted, study **Topic 10** ($b = .13$, $p = .02$) home, mother, girls, family, birth, support, three, adopted, sister, foster growing, care, biological	
Community-Neighbors	**Topic 2** ($b = .17$, p $= .006$) project, will, scout, eagle, scouts, building, donation, boy, complete, troop, rank, school, also, materials, name, camp, area, supplies, items **Topic 18** ($b = .12$, p $= .02$) will, police, park, county, case, officers, event, public, faith, PLU campus, law, Kukuihaele, take, ball, sexual, island, around, plan	
Education-Schools-Learning	**Topic 0** ($b = .15$, $p = .003$) will, project, design, science, Harvard, engineering, technology, Chicago, build, academy, tools, low, tech, farm, architecture, testing, computer, space **Topic 13** ($b = .11$, $p = .03$) family, years, mom, children, life, mother, cancer, people, father, high, away, sister, system, news, wanted, man, scholarship, left	
Funerals-Memorials-Tributes	**Topic 3** ($b = .10$, $p = .03$) parents, Phoenix, longer, hold, watch sense, page, breathe, nightmare, taught, humor, gift, us **Topic 5** ($b = .19$, $p < .001$) campaign, financial, along, share, together, fire, times, now, also, want, community, grieve, terrible, purpose, shoulder, facing, must **Topic 19** ($b = .16$, $p = .003$) children, mother, left, wife, two, behind, years, three, old, father, boys, single, due, girls, leaves, year, daughters, income, four	**Topic 11** ($b = -.11$, $p = .05$) help, can, burial, time, life, ask, give, thank, need, anything, insurance, appreciate, cost, friends, advance, money, sister, unexpectedly, proper
Medical-Illness-Healing	**Topic 4** ($b = .14$, $p = .005$) cancer, treatment, tumor, brain, chemotherapy, radiation, diagnosed, found, treatments, aggressive, months, spread, tumors, news, biopsy, scan, chemo, results, lymph **Topic 12** ($b = .31$, $p < .001$) disease, daughter, years, drug, veterans, genetic, year, NPC, therapy many, program, United States, war, testing, specialist, last	**Topic 1** ($b = -.11$, $p = .03$) help, can, get, know, people years, even, now, mom, last, right, just, really, like
Non-profits-Charities	**Topic 0** ($b = .16$, $p = .002$) community, women, us, Allah, house center, Ramadan, beach, violence, pride, healing, sharing, space, donate, parade, network, partner, service, Fresno **Topic 2** ($b = .18$, $p < .001$) book, foundation, can, Armenian, medical, aid, supplies, education, lives, silent, nonprofit, provide, late, united, tax, victims	

(*continued on next page*)

Table 4 (*continued*)

Categories	Positive Topics	Negative Topics
Volunteer-Service	**Topic 5** (b = .12, p = .02) shark, team, best, buddies, habitat, one, chapter, sharks, conservation, Maryland, humanity, leadership, Oceana, international, organization **Topic 10** (b = .16, p = .003) women, Uganda, refugees, girls, medical, many, need, project, refugee, children, years, India, organization, Laos, org, war, families **Topic 17** (b = .14, p = .01) children, God, Haiti, care, center, life, family, home, journey, orphanage, child, young, provides, women, house, families, August **Topic 18** (b = .16, p = .003) health, medical, medicine, program, student, college, nursing, care, community, one, world, however, hospital, pre, nurse, project, mental, healthcare, accepted **Topic 19** (b = .21, p < .001) homeless, people, community, urban, seed, together, like, communities, addiction, home, indigenous, homelessness, play, work, drug, position, streets, food	

and negative topics can be seen in Table 4, which provides tentative but meaningful answers to *RQ1* and *RQ2a*.

Similar to *RQ2a*, *RQ2b* asked if video and picture effects would interact with category. The implication of *RQ2b* is threefold: first, the author wondered if videos and pictures are evenly used across different categories. Second, if the use is uneven, would the use of videos and pictures be particularly helpful in some types of projects than in others? Finally, holding the use of videos and pictures constant, what types of projects attract the largest donations?

The first sub-question of *RQ2b* was tested by a one-way multivariate analysis of variance (MANOVA), with the dependent variables being numbers of videos and picture and category as the fixed factor. It turned out that category difference had statistically significant influence on the outcomes, Wilks' Lambda = .96, $F(16, 4120)$ = 11.79, p < .001, η_p^2 = .02. Specifically, the numbers of videos significantly differed across different categories, $F(8, 4128)$ = 16.35, p < .001. The same conclusion was also applied to picture distribution across categories, $F(8, 4128)$ = 7.19, p < .001 (see also Fig. 1a and b).

The second sub-question of *RQ2b* was tested by a three-way MANOVA (three-way main effects and selected two-way interactions), with the dependent variables being TD and AD, and fixed factors being "VideoDummy" (dummy-coded, 0 = no video/1 = video), "PictureDummy" (dummy-coded, 0 = no picture/1 = picture) and "Category". All six main effects were found to be statistically significant except the effect of PictureDummy on TD, $F(14099)$ = .289, p = .59. The analysis of variance was further advanced by including the interaction terms. Significant "Category∗VideoDummy" interaction effects were found on both TD, $F(8, 4099)$ = 2.76, p = .005, and AD, $F(8, 4099)$ = 2.44, p = .01; however, the "Category∗PictureDummy" interaction effect was only found on AD, $F(8, 4099)$ = 3.93, p < .001 but not on TD, $F(8. 4099)$ = 1.06, p = .39. Fig. 2a, b, 3a, and b provide clear visualizations of the interaction effects.

The third sub-question of *RQ2b* was tested by one-way multivariate analysis of covariance (MANCOVA), with the dependent variable being TD and AD, the fixed factor being "Category", and "Videos" and "Pictures" being covariates (continuous, not dummy-coded). Fig. 4a and b show that when holding video and picture modalities constant, "Medical-Illness-Healing" was more successful in attracting TD than other projects that appeared less urgent, whereas "Babies-Kids-Family" seemed to have the most dedicated donors that contributed the highest average AD (see also Fig. 4a and b).
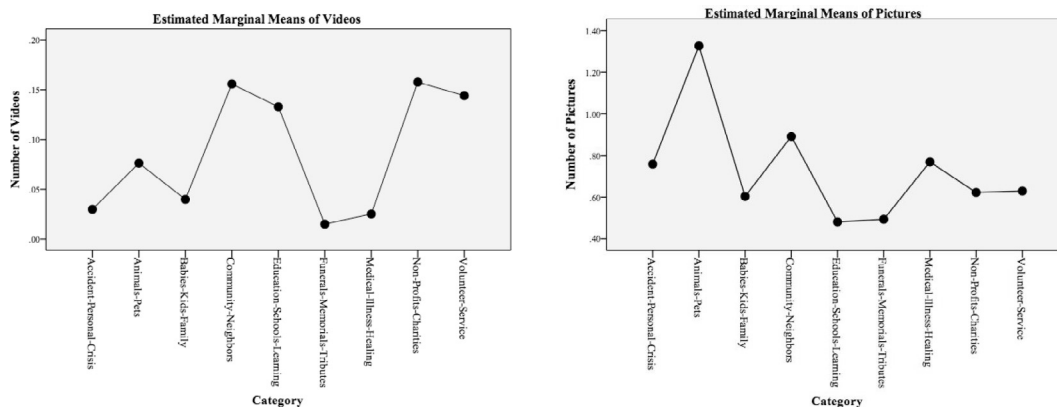

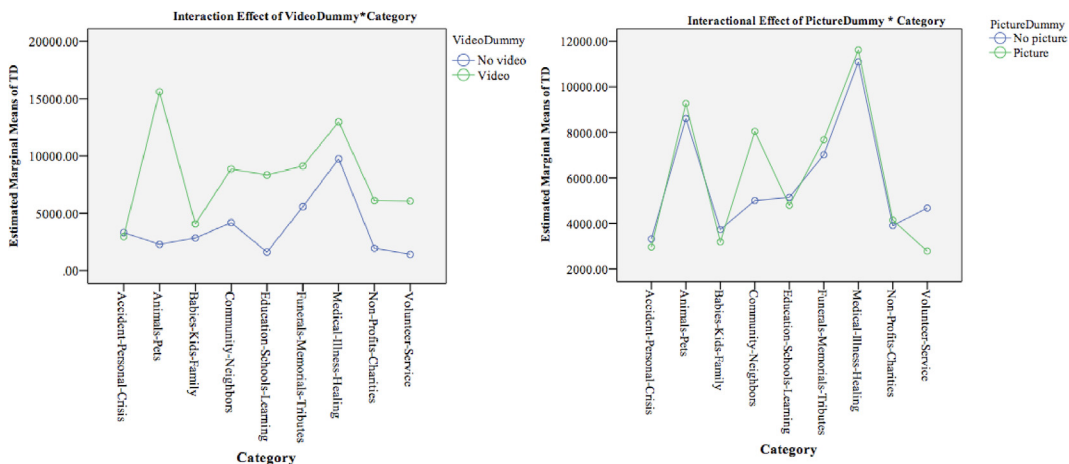**Fig. 1.** a (left) and b (right). Video and picture distributions across categories.

Fig. 2. a (left) and b (right). The interaction effects of modality * category on TD.
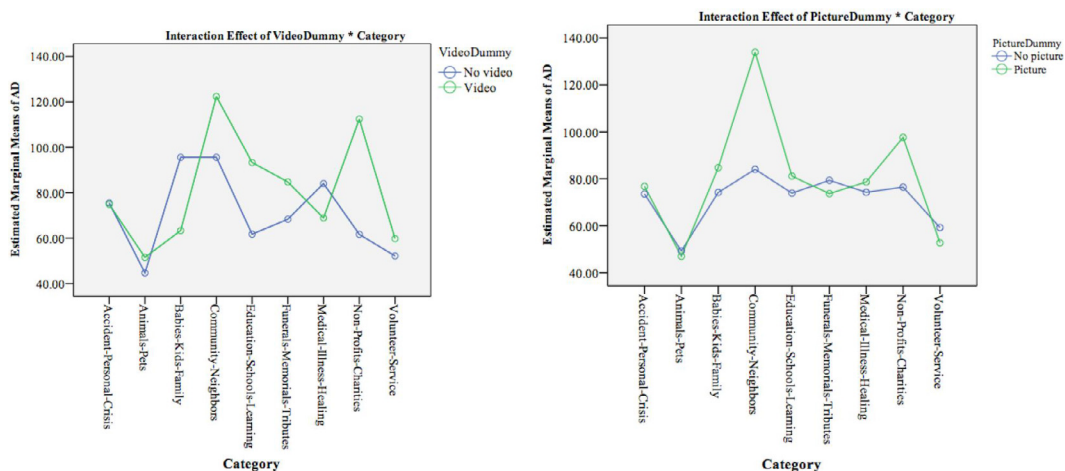

Fig. 3. a (left) and b (right). The interaction effects of modality * category on AD.
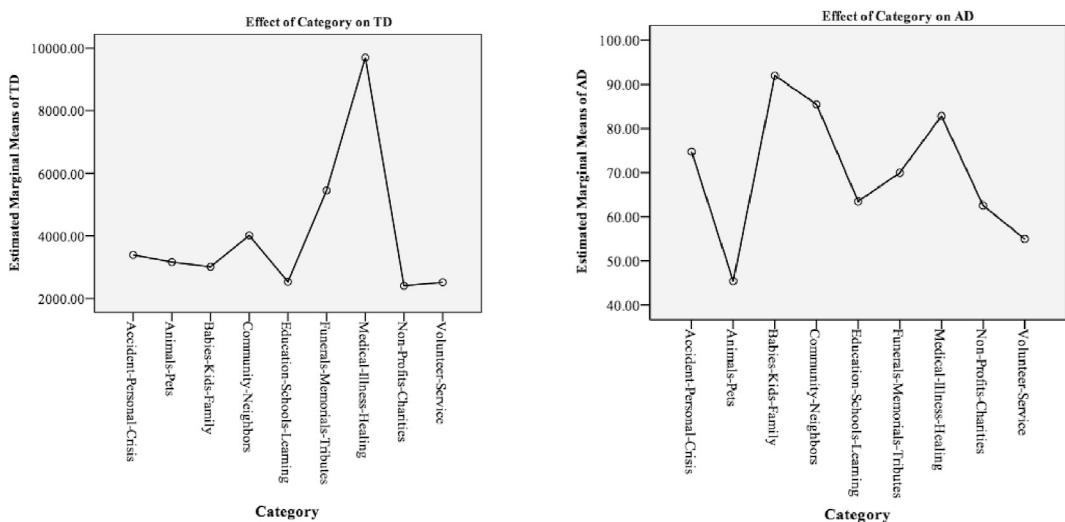

Fig. 4. a (left) and b (right). The interaction effects of modality * category on TD and AD.

5. Discussion

The study examines the effects of video, picture, and text on crowdfunding donations, which also sheds light on the complex contingencies of modality effects in different categories of projects. The findings indicate that only a limited number of donation-based projects leveraged the benefits of embedding videos and pictures. Although having more videos and pictures generally predicted an increase in donation, the increase was unevenly distributed across different categories of projects. Meanwhile, topic modeling distinguished word clusters from description texts. While a variety of topic words relating to factual details positively predicted the fundraising outcomes, clusters featuring the overuse of requesting words such as "help", "money", and "thank" seemed to backfire on the petitioners. The findings have important implications for the understanding of the dynamics in donation-based crowdfunding.

5.1. The unique landscape of donation-based crowdfunding

As a buzzword of our time, crowdfunding has been used by different social actors for a variety of personal and organizational purposes. As the users and purposes differ, however, the processes and outcomes are also likely to diverge. While some employ crowdfunding to seize the lucrative opportunities, others may use it as the last resort. Therefore, donation-based projects may be disparate from reward- and equity-based projects concerning the different expectations set by the fundraisers from the very beginning, as well as the approaches whereby the expectations are met. For example, in the current study, eighty-five percent of the projects did not contain a single video, and sixty-five percent of the projects did not have any pictures embedded. This is in sharp contrast to previous studies on Kickstarter, which found the majority of projects well utilized videos and pictures (e.g. Koch and Siering, 2015; Mollick, 2014). Considering Kickstarter as a representative of reward- and equity-based, for-profit crowdfunding platform, the differences in multimedia use may suggest that donation-based crowdfunding for nonprofits is saliently characterized by less sophisticated message design and delivery. The underuse of videos and picture may be, on the one hand, due to the fact or consideration that it would be less proper for some projects to be visually represented (e.g. accidents, funerals), and on the other, because of the lack of capabilities and resources for some fundraisers to create multimedia content. In the sample, the three leading categories in video use were "Community-Neighbors", "Non-Profit-Charities", and "Education-School-Learning", and the lagging ones were "Medical-Illness-Healing" "Accident-Personal-Crisis", and "Funerals-Memorials-Tributes" (see Fig. 1a). It seems that video production is lopsided, in favor of organization-initiated projects that can easily recruit professional multimedia producers and disfavor individual-initiated ones that have to rely on the fundraisers themselves. After all, it would be unsurprising that individuals struggling with tragedies and crises do not have the time and energy to create and edit videoclips. Therefore, although crowdfunding has been burgeoning and is believed to be an alternative and effective solution to many social problems, the study shows it would be premature to draw conclusions across the board. In fact, it requires closer attention to understand the unique dynamics of donation-based campaigns, as assumptions and principles held true in other types of projects may not apply in this specific context.

5.2. The uneven effects of videos and pictures

Whereas using videos and pictures is recommended by many crowdfunding platforms as a golden rule, results from this study show that their effects can be inconsistent. For example, having an additional video in "Animal-Pets" projects could produce an average revenue increase of over 10,000 dollars, yet the effects were much weaker in "Babies-Kids-Family". Despite the lack of modality effects, however, donors in the latter category were much more committed, contributing twice as much ($M = 91.99$, $SD = 5.30$) as those in the former category ($M = 45.35$, $SD = 1.30$). A possible explanation has to do with the perceived urgency of the projects. As shown in Fig. 2, in categories where the perceived urgency is high (e.g. Accident-Personal-Crisis, Babies-Kids-Family, Funerals-Memorials-Tributes, Medical-Illness-Healing), modality effects tend to be minimal. This suggest that the decision-making of donors could be influenced but by no means dominated by the modalities through which messages are distributed. Consistent with dual processing theories such as elaboration likelihood model (Petty and Cacioppo, 1986), the study showcases that modality cues may well trigger the peripheral route, but a video alone might be insufficient in activating the central route in which great amount of cognition and message elaboration are involved. Another reason leading to the inconsistencies may be the strength of ties between fundraisers and donors. As discussed by Borst et al. (2018), some projects can be categorized as "friendfunding", because donations are mainly obtained from family and friends; conversely, other projects have the tendency to activate the weak ties or even mobilize the strangers. In this case, "Babies-Kids-Family" may fit into the category of friendfunding that is expected to seek donations from tight-knit social circles, while "Animals-Pets" might have the potential to diffuse further in the Internet considering how animals and pets often transcend social, cultural, and national boundaries to receive global attention. Lastly, relevance may be yet another factor leading to the differences. For instance, the strongest picture effect was found in "Community-Neighbor", and these projects were likely to be funded by community members and neighborhood residents directly relevant to the campaigns. Therefore, pictures might have worked better because the donors were more familiar with the settings represented in the pictures.

5.3. When shouting help doesn't help

The three topics that were found to impair fundraising outcomes all included the highest loaded topic word, "help". This finding should be interpreted with caution. The word "help" per se is not to blame, because the way topic modeling works is based on word co-occurrences, and "help" is part of the topics that feature the overuse of requesting words without touching upon the factual details backing up the requests and petitions (see Table 4). The co-occurrences of "help" with "money", "need", "thank", and "please"

suggest that some fundraisers may choose to draft simple (and perhaps short) descriptions when facing adversity, which could unfortunately signal the unpreparedness of the fundraisers and un-worthwhileness of the donations (Feldmann and Gimpel, 2016). As crowdfunding for personal expenses has become an increasingly contested issue (Jopson, 2018), the excessive use of requesting words may leave a bad impression on the donors who have to judge if the fundraisers are ethical, honest, and respected based on the cues they provide in project descriptions. On the contrary, topics that describe the incidents with full and accurate facts and details were found to contribute to donations to a large extent. Echoing Anderson (2016), victim- and children-related topics positively predicted donation (see Table 4 for details), although positive topics were context-sensitive and differed in various campaigns. Therefore, even though word selection is often automatic and contextual which makes it difficult to generate a blacklist of "words-to-avoid", the study red-flags a potential minefield characterized by the over-reliance on the requesting words in description texts.

5.4. Limitations and future directions

Theoretically, the study abridges the cognitive, attitudinal, and intentional components of the classical persuasion model, only focusing on the input, conceptualized as the modality use in project description, and the output as measured by fundraising outcomes. Although the mediating mechanism can be partially disclosed by affective indicators such as the number of "Favorites", it is insufficient to provide a well-rounded picture of how such collective persuasion takes place. Proactive and reactive content such as comments and conversations may better capture cognitive, attitudinal, and intentional change of the donors. With these data, it is also possible for future research to further explain why certain modalities have greater effects in some categories than others. Methodologically, the author used machine learning algorithms to classify latent topics. As an exploratory study, the classifiers used were rather coarse-tuning in an attempt to get results of breadth at the expense of depth. Further analysis can be performed using more fine-tuning classifiers. In-depth content and discourse analyses would also be helpful to the interpretation of results from topic modeling.

6. Conclusion

Will a digital camera cure your sick puppy? The attention-seeking title of the article is not so much of a quest for a definite answer but is rather an illumination of the equal importance of modality and category effects in crowdfunding. In general, the results show that a camera may be more helpful for some, less so for others, just like crowdfunding itself. Whereas the dramatic growth of crowdfunding industry has depicted the future visions of fundraising, it may also deliver false promises to the public, making people assume campaigns for entirely different purposes would work similarly. The current study is situated in the context of donation-based crowdfunding and shows the complex conditionality for nonprofit campaigns to work as intended. Specifically, it contributes to the existing literature in three ways. First of all, even though donation-based campaigns fall under the overarching umbrella of crowdfunding, they are distinct from for-profit fundraising initiatives in terms of different objectives, expectations, and motivations for participation, which current literature has yet to adequately document. The gap between entrepreneurial and charitable crowdfunding is revealed in the study through the disparate modality use patterns, especially when campaigns are launched by individuals for personal expenses. Hence, the easily neglected digital divide between entrepreneurs and donation-seeking fundraisers should be acknowledged by both scholars and practitioners. Practically, it may be possible for platforms to target donation-seeking fundraisers and use alternative strategies, such as assigning project managers to oversee the projects and advise the fundraisers, in order to encourage more effective campaign design. Second, despite the optimism previous studies have on the power of video and picture, the study shows that their effects are not universal and unconditional but are volatile and contingent on a variety of factors. Therefore, the intuition that more videos and pictures are necessarily better might not always hold true; rather, the influence of multimedia content will be maximized only if they are used aptly and in rapport with the projects. Lastly, like all other persuasive campaigns, it is crucial to craft well-articulated project descriptions that incorporate factual evidence to buttress the requests. It will be futile to simply voice needs without providing a compelling story enriched with necessary details to inform the donors that their monetary contributions are worthwhile.

References

Agrawal, A.K., Catalini, C. Goldfarb, A., 2013. Some simple economics of crowdfunding (No. w19133). National Bureau of Economic Research. Available at: http://www.nber.org/papers/w19133.pdf.

Allison, T.H., Davis, B.C., Short, J.C., Webb, J.W., 2015. Crowdfunding in a prosocial microlending environment: Examining the role of intrinsic versus extrinsic cues. Entrepreneurship Theory Pract. 39, 53–73.

Anderson, K.B., 2016. Let me tell you a story: an exploration of the compliance-gaining effects of narrative identities in online crowdfunding textual appeals. Doctoral dissertation, State University of New York at Buffalo.

Appiah, O., 2006. Rich media, poor media: The impact of audio/video vs. text/picture testimonial ads on browsers' evaluations of commercial Web sites and online products. J. Curr. Issues Res. Advertising 28, 73–86.

Aprilia, L., Wibowo, S.S., 2017. The impact of social capital on crowdfunding performance. East Asian J. Manage. 11, 44.

Arun, R., Suresh, V., Madhavan, C.V., Murthy, M.N., 2010. On finding the natural number of topics with latent Dirichlet allocation: Some observations. In: Pacific-Asia Conference on Knowledge Discovery and Data Mining. Springer, Berlin, Heidelberg, pp. 391–402.

Belleflamme, P., Lambert, T., Schwienbacher, A., 2014. Crowdfunding: tapping the right crowd. J. Bus. Ventur. 29, 585–609.

Berliner, L.S., Kenworthy, N.J., 2017. Producing a worthy illness: personal crowdfunding amidst financial crisis. Soc. Sci. Med. 187, 233–242.

Blei, D.M., Ng, A.Y., Jordan, M.I., 2003. Latent Dirichlet allocation. J. Mach. Learn. Res. 3, 993–1022.

Borst, I., Moser, C., Ferguson, J., 2018. From friendfunding to crowdfunding: relevance of relationships, social media, and platform activities to crowdfunding performance. New Media Soc. 20, 1396–1414.

Briggman, S., 2014. Kickstarter crowdfunding: How the predictors of success vary by project category. Economics 4198, 12.

Cantril, H., Allport, G.W., 1935. The psychology of radio. Harper, New York.

Chaiken, S., Eagly, A.H., 1976. Communication modality as a determinant of message persuasiveness and message comprehensibility. J. Pers. Soc. Psychol. 34, 605.

Chaiken, S., Eagly, A.H., 1983. Communication modality as a determinant of persuasion: the role of communicator salience. J. Pers. Soc. Psychol. 45, 241.

Colgren, D., 2014. The rise of crowdfunding: social media, big data, cloud technologies. Strategic Fin. 95, 56–57.

Daft, R.L., Lengel, R.H., 1986. Organizational information requirements, media richness and structural design. Manage. Sci. 32, 554–571.

Davies, R., 2015. Three provocations for civic crowdfunding. Information Commun. Soc. 18, 342–355.

Dehghani, M., Johnson, K.M., Garten, J., 2017. TACIT: an open-source text analysis, crawling, and interpretation tool. Behav. Res. Methods 49, 538–547.

Dey, S., Duff, B., Karahalios, K., Fu, W.T., 2017. The art and science of persuasion: Not all crowdfunding campaign videos are the same. In: Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing. ACM, pp. 755–769.

Drake, D., 2017. 2,000 global crowdfunding platforms to choose from by 2016: top 5 growth indicators. Available at: https://www.huffingtonpost.com/david-drake/2000-global-crowdfunding-_b_8365266.html.

Etter, V., Grossglauser, M., Thiran, P., 2013. Launch hard or go home!: predicting the success of kickstarter campaigns. In: Proceedings of the first ACM conference on Online social networks. ACM, pp. 177–182.

Feldmann, N., Gimpel, H., 2016. Financing projects through Enterprise crowdfunding: understanding the impact of proposal characteristics on funding success. In: ECIS (pp. Research-in).

Frydrych, D., Bock, A.J., Kinder, T., 2014. Exploring entrepreneurial legitimacy in reward-based crowdfunding. Venture Capital 16, 247–269.

Garcia, A., 2016. 65 GoFundMe accounts raising money for Flint water crisis. Available at: http://money.cnn.com/2016/01/23/technology/flint-water-gofundme-campaigns/index.html.

Gerber, E.M., Hui, J.S., Kuo, P.Y., 2012. Crowdfunding: why people are motivated to post and fund projects on crowdfunding platforms. In: Proceedings of the International Workshop on Design, Influence, and Social Technologies: Techniques, Impacts and Ethics (Vol. 2, No. 11).

Gubrium, J.F., Holstein, J.A., 2008. Analyzing Narrative Reality. Sage, London.

Huber, J.B.J., 2014. Does storytelling increase startups' crowdinvesting success? Doctoral dissertation. Universität St. Gallen.

Jian, L., Usher, N., 2014. Crowd-funded journalism. J. Comput.-Mediated Commun. 19, 155–170.

Jopson, B., 2018. Why are so many Americans crowdfunding their healthcare? Available at: https://www.ft.com/content/b99a81be-f591-11e7-88f7-5465a6ce1a00.

Kahl, L.H., 2015. A story for the crowd: a quantitative analysis of the effects and elements of storytelling within crowdfunding campaigns. Doctoral dissertation, Universität St. Gallen.

Kickstarter Creator Handbook, 2017. Available at: https://www.kickstarter.com/help/handbook/your_story?ref=handbook_index.

Kim, K.J., Sundar, S.S., Park, E., 2011. The effects of screen-size and communication modality on psychology of mobile device users. In: CHI'11 Extended Abstracts on Human Factors in Computing Systems. ACM, pp. 1207–1212.

Koch, J.A., Siering, M., 2015. Crowdfunding success factors: the characteristics of successfully funded projects on crowdfunding platforms. In: Twenty-Third European Conference on Information Systems.

Kuppuswamy, V. Bayus, B.L., 2013. Crowdfunding creative ideas: the dynamics of project backers in Kickstarter. UNC Kenan-Flagler Research Paper. Available at: https://funginstitute.berkeley.edu/wp-content/uploads/2013/11/Crowdfunding_Creative_Ideas.pdf.

Lu, C.T., Xie, S., Kong, X., Yu, P.S., 2014. Inferring the impacts of social media on crowdfunding. In: Proceedings of the 7th ACM international conference on Web search and data mining. ACM, pp. 573–582.

Manning, S., Bejarano, T.A., 2017. Convincing the crowd: entrepreneurial storytelling in crowdfunding campaigns. Strategic Organization 15, 194–219.

McGinnies, E., 1965. A cross-cultural comparison of printed communication versus spoken communication in persuasion. J. Psychol. 60, 1–8.

Meer, J., 2014. Effects of the price of charitable giving: Evidence from an online crowdfunding platform. J. Econ. Behav. Organ. 103, 113–124.

Mitra, T., Gilbert, E., 2014. The language that gets people to give: Phrases that predict success on kickstarter. In: Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing. ACM, pp. 49–61.

Mollick, E., 2014. The dynamics of crowdfunding: an exploratory study. J. Bus. Ventur. 29, 1–16.

Murray, A., Kotha, S. Fisher, G., 2015. Persuading crowds: Mindset, learning and influence mechanisms in crowdfunding campaigns. In: Academy of Management Proceedings (Vol. 2015, No. 1, p. 18344). Academy of Management.

Özdemir, V., Faris, J., Srivastava, S., 2015. Crowdfunding 2.0: the next-generation philanthropy. EMBO Rep. 16, 267–271.

Petty, R.E., Cacioppo, J.T., 1986. Message elaboration versus peripheral cues. In: Communication and persuasion. Springer, New York, NY, pp. 141–172.

Pew Research Center, 2016. Collaborative: Crowdfunding platforms. Available at http://www.pewinternet.org/2016/05/19/collaborative-crowdfunding-platforms/.

Pfau, M., Holbert, R.L., Zubric, S.J., Pasha, N.H., Lin, W.K., 2000. Role and influence of communication modality in the process of resistance to persuasion. Media Psychol. 2, 1–33.

Statista, 2017. Number of monthly active Facebook users worldwide as of 4th quarter 2017 (in millions). Available at: https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/.

Sundar, S.S., 2000. Multimedia effects on processing and perception of online news: A study of picture, audio, and video downloads. Journalism Mass Commun. Quarterly 77, 480–499.

Sundar, S.S., 2008. The MAIN model: A heuristic approach to understanding technology effects on credibility. In: Metzger, M.J., Flanagin, A.J. (Eds.), Digital Media, Youth, and Credibility. MA, MIT Press, Boston, pp. 73–100.

Tenca, F., 2015. Crowdfunding: the impact of entrepreneurial passion on the acquisition of financial resources. In: Academy of Management Proceedings (Vol. 2015, No. 1, p. 13739). Academy of Management.

Wallach, H.M., 2006. Topic modeling: beyond bag-of-words. In: Proceedings of the 23rd international conference on Machine learning. ACM, pp. 977–984.

Walther, J.B., 1992. Interpersonal effects in computer-mediated interaction a relational perspective. Commun. Res. 19, 52–90.

Wash, R., 2013. The value of completing crowdfunding projects. Available at: http://www.aaai.org/ocs/index.php/ICWSM/ICWSM13/paper/download/6003/6403.

Wash, R., Solomon, J., 2014. Coordinating donors on crowdfunding websites. In: Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing, pp. 38–48.

Wheat, R.E., Wang, Y., Byrnes, J.E., 2013. Raising money for scientific research through crowdfunding. Trends Ecol. Evol. 28, 71–72.

Xu, L.Z., 2015. Exploring the impact of diffusion network and content characteristic on crowdfunding. Paper presented at the NCA (National Communication Association) 2015 Annual Convention, Las Vegas, Nov 19–22.

Xu, L.Z., Ge, Z., 2016. A two-mode network analysis of crowdfunding donors in structural equivalence. Paper presented at the INSNA (International Network of Social Network Analysis) 2016 XXXVI Sunbelt Conference, Newport Beach, Apr 5–10.

Xu, A., Yang, X., Rao, H., Fu, W.T., Huang, S.W., Bailey, B.P., 2014. Show me the money! An analysis of project updates during crowdfunding campaigns. In: Proceedings of the SIGCHI conference on human factors in computing systems. ACM, pp. 591–600.

Yuan, H., Lau, R.Y., Xu, W., 2016. The determinants of crowdfunding success: A semantic text analytics approach. Decis. Support Syst. 91, 67–76.

Yurieff, K., 2017. Facebook launches personal fundraising tool. Available at: http://money.cnn.com/2017/03/30/technology/facebook-personal-fundraising/index.html.

Zheng, H., Li, D., Wu, J., 2014. The role of multidimensional social capital in crowdfunding: a comparative study in China and US. Information Manage. 51, 488–493.

Short bio: Larry Zhiming Xu is a Ph.D. Candidate at the Annenberg School for Communication and Journalism, University of Southern California, USA. His research interests include communication technology and social network, particularly in the contexts of crowdsourcing and crowdfunding communities.