Illustrate Future as ‘Near’ -

Predicting Success in Crowdfunding through the lens of Construal Level Theory using Multimodal Deep Learning.

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**Abstract**

Crowdfunding has become an important platform for entrepreneurs to raise money and spread awareness. An online profile of a project consists of text, visual, and meta data. This research examines how all these aspects are associated with the success of project funding. This paper combines theory and research from social-psychology (e.g., construal level theory (CLT), behavior, influence and persuasion) with multimodal machine learning methods, to predict the successful funding of projects. Findings from the analysis of real-world large-scale crowdfunding data show construal levels of textual and image elements of the project descriptions impacts the funding success of crowdfunding projects.

keywords: construal level theory, crowdfunding, social influence, money giving, psychological distance, machine learning, multimodal analysis.

**Introduction**

For entrepreneurs, crowdfunding platforms provide an opportunity to raise funds online from backers who support their projects1. Having their project successfully funded is crucial to project creators as it provides not only initial funds for project development but also access to valuable future resources, and eventually turn their projects into successful entrepreneurial organizations (Mollick, 2014). However, extant research shows that only 45 % of the projects on these platforms are successfully funded (Greenberg et al., 2013; E. Mollick, 2014) and >75% of successful projects deliver products later than promised (Mollick & Kuppuswamy, 2014). No doubt, backers hesitate over project feasibility, creator expertise as just 50% of projects reach the proposed completion milestone (Stanko & Henard, 2017). Crowdfunding is thus is a unique proposition where there is a temporal distance between the product ownership and contribution by the backer, which makes it pertinent for the backer to actively look for cues to reduce uncertainty and predict successful campaigns when contributing (Ahlers et al., 2015; Mollick, 2013).

As a result, identifying general antecedents of funding success has been of great interest to researchers because it can provide insights to project creators to maximize their funding success (Greenberg et al., 2013). Many researchers have investigated antecedent based success factors for crowdfunding projects such as campaign duration, facebook network of the project creator, funding goal, etc. (Agrawal et al., 2011; Etter et al., 2013; Kuppuswamy & Bayus, 2013; E. Mollick, 2014). In parallel, researchers have also used machine learning tools to study optimum models for success prediction (Etter et al., 2013; Zhang et al., 2015; Zhao et al., 2017). However,

1World Bank estimates crowdfunding to reach $96 billion per annum by 2025.

there has been little attempt to understand the unique property of crowdfunding - which is the temporal distance between contribution and product acquisition. This paper takes up the issue by drawing upon Construal Level Theory (CLT) (Trope & Liberman, 2010). Studies show how feasibility related information (low-construal) have a greater influence on purchase choices for nearer future, while desirability information (high-construal) have a greater influence on choices for the more distant future (Trope et al., 2007). Thus, we invoke CLT to allows us to seek out answers as to how the construal-sensitized use of text and visuals in the project description can signal credibility with backers, and thereby enhance funding success

We propose a novel method combining computational techniques like text mining and multimodal methods modelled on CLT to predict funding success basis combination of text and image in the project description. This study is based on the premise that the project description should be designed keeping the backer’s perspective foremost. Hence the need to have an effective description that lowers the uncertainty perception among future investors. Our findings emphasize that low construal-based project descriptions (using both text and visual) enhances funding success and is thereby instrumental in mitigating uncertainty perception among backers.

**Theoretical Background**

Crowdfunding is a unique proposition and can be seen as an extension of a traditional seller-buyer transaction with a unique condition – of temporally distant future product possession alongwith immediate contribution. The project description is the only source where the backer draws inferences on product quality, project credibility and overall certainty and hence it becomes extremely critical to the funding. While product quality judgements are inferences drawn from observable features (Erdem & Swait, 2004; Rao et al., 1999), here it is drawn from a parallel feature – such as inferring the taste of a food basis the extrinsic feature such as package attractiveness (Elder & Krishna, 2010; Krishna & Morrin, 2008) which in this case would be the project description.

**Construal Level Theory and Decision Making**

CLT has been used extensively to understand consumer behavior and decision making. Prior research on CLT shows that how consumers construe a situation and the psychological distance they experience influence their judgement and behavior. CLT professes that increase in spatial, temporal, hypothetical or social distances increases levels of abstractions for consumers (Kim et al., 2009; Trope et al., 2007; Trope & Fishbach, 2000; Trope & Liberman, 2003, 2010; Tsai & McGill, 2011). A high-level construal is generally abstract and involves superordinate mental representations (Trope & Liberman, 2010) compared to a low level construal that is more concrete and context based. There are many ways CLT is used to explain consumer behavior. For instance - advertising claims should be congruent with the distance it is viewed from (Dhar et al., 2007). Ads seen from a distant place should emphasize on product’s core (high level) features (cleaning effectiveness for detergents) vs ads viewed in store should focus on peripheral (low level) features (price off, deal). Hence, when a product is represented by high level, aspects related to its primary features (desirability) is more salient (why do I want to have this product?) and influence decision making. While in low construal, the product’s secondary features (feasibility) is more salient (how do I use the product? how do I get it?) and impacts evaluation.

Studies also show how the fit congruency impact product evaluation. If a purchase is planned in the near future (low construal), attribute appeals (feasibility) is more persuasive than benefit appeals and vice versa (Hernandez et al., 2015; Tsai & McGill, 2011). Further, (Baskin et al., 2014) posit how feasibility is more relevant for gift receivers and desirability for gift givers. Similarly, feasibility is important for self-purchase than purchasing for others (Dhar & Kim, 2007).

In case of crowdfunding, we propose that although the project is an investment in the future (and hence temporally high level), the backer is in an unique position of being in a low construal disposition as (i) he/she indulges in a purchase (contribution) in the immediate/near future (low level) and (ii) reward-based nature of the contribution is akin to a purchase for self (low level) rather than a gift for someone else (high level). Thereby, feasibility features would be more salient than desirability features for the backer. Moreover, high level or core features (benefits) are associated with major changes and low level features (color, price) are associated with minor changes (Monga & Bagchi, 2012). Thereby, to lower uncertainty or risk in the proximal future (Raue et al., 2015) and ensure minimal changes in the final product (Monga & Bagchi, 2012), the backer would be influenced more by the low level/ feasible features than high level / desirable features.

In light of the preceding argument, we draw up the following hypothesis:

Hypothesis 1a: A low-level construal (in the text and visual elements) of the project description will increase success of the project.

Hypothesis 1b: A high-level level construal (in the text and visual elements) of the project description will decrease success of the project.

Our goal is to learn a multimodal feature map F(X) for given (where represents the crowdfunding dataset with N projects). Success is defined as project creators reaching their initial goal by the stipulated time period of the campaign. The feature mapping would be:

(1)

Where

f. is a non-linear activation function (ReLu), is the weight and is the bias. We attempt to map the features for text data , image and meta data for both low-level and high-level construal.

Of note, there may be a view that the backers are on a high construal given the temporal and psychological distance of the project completion. Hence taking into consideration, prior studies focusing on construal fit (Berson & Halevy, 2014; H. Kim et al., 2009; Liberman & Trope, 2008), may appear to be inconsistent with our hypothesis. However we resolve this apparent dilemma and contribute to CLT showing its application in case of crowdfunding when there is a temporal mismatch in contribution and product possession.

**Data Description**

To evaluate the CLT-Multimodal framework, we use a scrapped dataset (Cheng et al., 2019) from Kickstarter.com from 2015-2017 consisting of 43,000 projects across consumer products, comics, films, music and art.

**References**

Agrawal, D., Bernstein, P., Bertino, E., Davidson, S., Dayal, U., Franklin, M., Gehrke, J., Haas, L., Halevy, A., Han, J., Jagadish, H. V., Labrinidis, A., Madden, S., Papakonstantinou, Y., Patel, J., & Ram, R. (2011). *Challenges and Opportunities with Big Data*. 19.

Ahlers, G. K. C., Cumming, D., Günther, C., & Schweizer, D. (2015). Signaling in Equity Crowdfunding. *Entrepreneurship Theory and Practice*, *39*(4), 955–980.

Baskin, E., Wakslak, C. J., Trope, Y., & Novemsky, N. (2014). Why Feasibility Matters More to Gift Receivers than to Givers: A Construal-Level Approach to Gift Giving. *Journal of Consumer Research*, *41*(1), 169–182.

Berson, Y., & Halevy, N. (2014). Hierarchy, leadership, and construal fit. *Journal of Experimental Psychology: Applied*, *20*(3), 232–246.

Cheng, C., Tan, F., Hou, X., & Wei, Z. (2019). Success Prediction on Crowdfunding with Multimodal Deep Learning. *Proceedings of the Twenty-Eighth International Joint Conference on Artificial Intelligence*, 2158–2164.

Dhar, R., & Kim, E. Y. (2007). Seeing the Forest or the Trees: Implications of Construal Level Theory for Consumer Choice. *Journal of Consumer Psychology*, *17*(2), 96–100.

Elder, R. S., & Krishna, A. (2010). The Effects of Advertising Copy on Sensory Thoughts and Perceived Taste. *Journal of Consumer Research*, *36*(5), 748–756.

Erdem, T., & Swait, J. (2004). Brand Credibility, Brand Consideration, and Choice. *Journal of Consumer Research*, *31*(1), 191–198.

Etter, V., Grossglauser, M., & Thiran, P. (2013). Launch hard or go home!: Predicting the success of kickstarter campaigns. *Proceedings of the First ACM Conference on Online Social Networks - COSN ’13*, 177–182.

Greenberg, M. D., Pardo, B., Hariharan, K., & Gerber, E. (2013). Crowdfunding support tools: Predicting success & failure. *CHI ’13 Extended Abstracts on Human Factors in Computing Systems on - CHI EA ’13*, 1815.

Hernandez, J. M. da C., Wright, S. A., & Ferminiano Rodrigues, F. (2015). Attributes Versus Benefits: The Role of Construal Levels and Appeal Type on the Persuasiveness of Marketing Messages. *Journal of Advertising*, *44*(3), 243–253.

Kim, H., Rao, A. R., & Lee, A. Y. (2009). It’s Time to Vote: The Effect of Matching Message Orientation and Temporal Frame on Political Persuasion. *Journal of Consumer Research*, *35*(6), 877–889.

Kim, Y.-J., Park, J., & Wyer, R. S. (2009). Effects of Temporal Distance and Memory on Consumer Judgments. *Journal of Consumer Research*, *36*(4), 634–645.

Krishna, A., & Morrin, M. (2008). Does Touch Affect Taste? The Perceptual Transfer of Product Container Haptic Cues. *JOURNAL OF CONSUMER RESEARCH*, 12.

Kuppuswamy, V., & Bayus, B. L. (2013). Crowdfunding Creative Ideas: The Dynamics of Project Backers in Kickstarter. *SSRN Electronic Journal*.

Liberman, N., & Trope, Y. (n.d.). *The Role of Feasibility and Desirability Considerations in Near and Distant Future Decisions: A Test of Temporal Construal Theory*. 14.

Liberman, N., & Trope, Y. (2008). The Psychology of Transcending the Here and Now. *Science*, *322*(5905), 1201–1205. JSTOR.

Mollick, E. (2014). The dynamics of crowdfunding: An exploratory study. *Journal of Business Venturing*, *29*(1), 1–16.

Mollick, E. R. (2013). Swept Away by the Crowd? Crowdfunding, Venture Capital, and the Selection of Entrepreneurs. *SSRN Electronic Journal*.

Mollick, E. R., & Kuppuswamy, V. (2014). *After the Campaign: Outcomes of Crowdfunding*.

Monga, A., & Bagchi, R. (2012). Years, Months, and Days versus 1, 12, and 365: The Influence of Units versus Numbers. *Journal of Consumer Research*, *39*(1), 185–198.

Rao, A. R., Qu, L., & Ruekert, R. W. (1999). Signaling Unobservable Product Quality through a Brand Ally. *Journal of Marketing Research*, *36*(2), 258–268.

Raue, M., Streicher, B., Lermer, E., & Frey, D. (2015). How far does it feel? Construal level and decisions under risk. *Journal of Applied Research in Memory and Cognition*, *4*(3), 256–264.

Stanko, M. A., & Henard, D. H. (2017). Toward a better understanding of crowdfunding, openness and the consequences for innovation. *Research Policy*, *46*(4), 784–798.

Trope, Y, Liberman, N., & Wakslak, C. (2007). Construal Levels and Psychological Distance: Effects on Representation, Prediction, Evaluation, and Behavior. *Journal of Consumer Psychology*, *17*(2), 83–95.

Trope, Yaacov, & Fishbach, A. (2000). Counteractive self-control in overcoming temptation. *Journal of Personality and Social Psychology*, *79*(4), 493–506.

Trope, Yaacov, & Liberman, N. (2003). Temporal construal. *Psychological Review*, *110*(3), 403–421.

Trope, Yaacov, & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, *117*(2), 440–463.

Tsai, C. I., & McGill, A. L. (2011). No Pain, No Gain? How Fluency and Construal Level Affect Consumer Confidence. *Journal of Consumer Research*, *37*(5), 807–821.

Zhang, H., Kim, G., & Xing, E. P. (2015). Dynamic Topic Modeling for Monitoring Market Competition from Online Text and Image Data. *Proceedings of the 21th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining - KDD ’15*, 1425–1434.

Zhao, H., Zhang, H., Ge, Y., Liu, Q., Chen, E., Li, H., & Wu, L. (2017). Tracking the Dynamics in Crowdfunding. *Proceedings of the 23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, 625–634.