The Effect of Psychological Distance on Negative Emotions toward Immoral Events: A Weibo-Based Study

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Abstract

Construal Level Theory posits that spatiotemporal differences influence individuals' psychological representation of events, thereby producing emotions of varying intensities; Psychological Typhoon Eye Theory, conversely, suggests that as spatial distance increases, individuals' emotional intensity becomes stronger, whereas those at the epicenter of the event remain calmer. The present study, based on the Weibo platform and utilizing big data research methodologies, selected two incidents involving the murder of female passengers in Didi ride-hailing services as research cases to examine the relationship between public negative emotions and psychological distance following the events, with psychological distance being conceptualized as two-dimensional: temporal distance and spatial distance. The findings indicate that the greater the distance from the location of the immoral event and the more time elapsed since the event' s occurrence, the higher the intensity of negative emotions generated by individuals.

Full Text

Introduction

Immoral behavior by others can evoke negative emotional responses in individuals. In the most influential basic emotion classification theory, Ekman (1971) posited that negative emotions can be categorized into four types: anger, sadness, disgust, and fear. According to Construal Level Theory, people' s reactions to social events depend on their psychological representation of those events, and such representations are hierarchical in nature. Different temporal and spatial contexts lead to different levels of psychological representation (Trope & Liberman, 2010). Consequently, individual differences in spatiotemporal distance

lead to variations in perceptions of immoral events, which in turn generate negative emotional responses of differing intensities.

Psychological distance refers to a cognitive separation that exists between the self and other people, events, or times (Baltatescu, 2014). From the perspective of material existence, it can be divided into temporal distance and spatial distance (Zhong & Chen, 2013). Therefore, individuals with different psychological distances may exhibit varying negative emotional reactions to immoral events. However, previous research has not explored the impact of spatiotemporal distance on negative emotions elicited by immoral events.

1.1 Construal Level Theory

Construal Level Theory proposes that people' s representations of events can be categorized into high-level construal and low-level construal. High-level construal is decontextualized, simpler, and more abstract, reflecting the core features of events; whereas low-level construal is contextualized, more complex and concrete, reflecting the superficial features of events. Spatiotemporal distance is a crucial factor influencing construal level, systematically affecting how people interpret future and distant events. Specifically, individuals tend to interpret temporally and spatially distant events more abstractly, using general, core, and decontextualized features that reflect the essence of events, while interpreting recent and proximal events more concretely, using incidental, peripheral, and contextualized features. For instance, research by Zhong and Chen (2013) on moral behavior judgment demonstrated that greater temporal distance leads to higher evaluations, while shorter temporal distance leads to lower evaluations. Fujita et al. (2006) found that when participants believed an event occurred at a more spatially distant location, they used more abstract language to describe behaviors and identified actions more based on outcomes than on means.

Research has shown that increased psychological distance can lead people to judge morally upright behaviors as more virtuous (Eyal, Liberman, & Trope, 2008) and morally transgressive behaviors as more immoral (Agerström & Björklund, 2009). Individuals at a greater distance may be more inclined to adopt high-level construal, grasping the core features of events and attributing immoral events to more immoral behavioral manifestations by perpetrators, thereby generating more intense negative emotions toward immoral events. Conversely, those in closer proximity may tend to adopt low-level construal, viewing the event as an incidental phenomenon and thus producing less intense negative emotions. Simultaneously, the longer the temporal distance from an immoral event, the more likely individuals are to experience higher intensity negative emotions.

1.2 Psychological Typhoon Eye Effect

In meteorology, the circular area approximately 10 kilometers in diameter from the center of a typhoon is commonly referred to as the "typhoon eye." In psy-

chology, Li et al. (Li et al., 2009; Li et al., 2009) synthesized previous research and metaphorically proposed the concept of the "psychological typhoon eye" (psychological typhoon eye), which posits that psychologically, individuals become calmer as they approach high-risk time periods (temporal dimension) and high-risk locations (spatial dimension).

In the era of flourishing big data technology, Weibo provides a more efficient and convenient channel for psychological research. Weibo is a social media platform based on user relationships, where users can access the platform through various terminals such as PCs and mobile phones, freely and publicly expressing opinions in multimedia formats including text, images, and videos, interacting with others, and achieving instant information sharing. Due to Weibo' s fission-style information dissemination, the speed of information spread is extremely rapid, allowing users to stay closely connected with the world and learn about social hot events and topics in real time. By the first half of 2018, Weibo' s user base had reached 337 million, making it the world' s largest social networking site.

Therefore, this study, based on the Weibo platform and employing big data research methods, selected incidents of female passenger victimization involving Didi Chuxing as the research objects for immoral events. We investigated the influence of psychological distance on negative emotions toward immoral events from both temporal and spatial distance perspectives. Based on Construal Level Theory and the psychological typhoon eye effect, this study hypothesized that the greater the spatial distance from the Didi incident location and the longer the temporal distance from the event, the higher the intensity of negative emotions generated by individuals.

Method

This study was conducted using Sina Weibo data, with Python and R software employed for data collection and processing. Among 1 million active Sina Weibo users nationwide, we crawled original Weibo posts related to two incidents of female passenger victimization involving Didi Chuxing using event-specific keywords. The first incident was the murder of flight attendant Li in Zhengzhou on May 6, 2018, and the second was the murder of young woman Zhao in Wenzhou on August 24, 2018. According to general patterns of public opinion, we only crawled Weibo data within one week after each event and analyzed the text content. Negative emotion intensity for each Weibo user was determined based on the word frequency of negative emotion-related terms in their posts. We recorded the posting time of each Weibo and the geographic location of the user, grouping them according to the number of days from the event (temporal distance) and the user' s city (spatial distance) to analyze the effects of temporal and spatial distance on negative emotions.

2.1 Weibo Data

For the first incident, we crawled 2,174 original Weibo posts published by 1,486 users during May 6–13, 2018. For the second incident, we crawled 9,375 original Weibo posts published by 5,550 users during August 24–31, 2018.

2.2 Negative Emotions

We selected negative emotion-related terms based on the Basic Emotion Lexicon for Microblogs compiled by Dong et al. (2015). This lexicon, grounded in the categorical structure theory of emotions, categorizes Weibo emotions into five types: happiness, sadness, anger, fear, and disgust. It includes both standard emotion vocabulary and commonly used emotional expressions on Weibo, featuring a large vocabulary with broad coverage. We selected the negative emotion dimensions, namely sadness, anger, fear, and disgust. The sadness category contained 205 words, disgust contained 142 words, anger contained 93 words, and fear contained 72 words, totaling 818 words. We counted the word frequency of each emotion term in every original Weibo post.

2.3 Psychological Distance

When examining the effect of temporal distance on negative emotions, we converted the timestamps of original Weibo posts to specific times and calculated the distance between the posting time and the event occurrence time for both incidents, using the number of days as the temporal distance indicator. Given that the word frequency of negative emotion terms in most original Weibo posts was 0, we divided the temporal distance into 8 groups (0–7 days) to make the results more representative. We then calculated the total word frequency of each negative emotion term for each group. To avoid the influence of inconsistent daily posting volumes, we divided the word frequency of each emotion type by the total number of original Weibo posts published on that day to obtain the average word frequency for each emotion term on that day.

When examining the effect of spatial distance on emotion intensity, we used the user' s registered location as the posting location, converted it to latitude and longitude coordinates, and calculated the spatial distance between the posting location and the event location for both incidents. Similar to the temporal distance processing, given the small number of emotion words in each Weibo post, we also summed and averaged the word frequencies according to grouping criteria. We categorized Weibo posts by the province of the user's registered location, summed the word frequencies of emotion terms for all posts from the same province, and divided by the total number of Weibo posts from that province to obtain the average word frequency of each emotion term for users from that province. We deleted user data with overseas or unspecified registration locations, retaining 1,959 Weibo posts for the first incident and 8,421 posts for the second incident.

2.4 Data Analysis

We conducted simple linear regression analysis with temporal distance (number of days from the event) as the independent variable and negative emotion intensity (average word frequency of emotion terms for that day) as the dependent variable.

To investigate the linear and nonlinear effects of geographic distance on emotion intensity, we conducted regression analyses with spatial distance as the independent variable, using both standardized geographic distance and standardized squared geographic distance as indicators (Zhang et al., 2012), and negative emotion intensity by province (average word frequency of emotion terms) as the dependent variable. We used hierarchical polynomial regression analysis with the following procedure: In the first step, we entered spatial distance; if the regression coefficient was significant, it indicated a linear relationship between spatial distance and emotion intensity. In the second step, we entered the squared term of spatial distance; if the squared term' s regression coefficient was significant and the R^2 increment was meaningful, it demonstrated a nonlinear relationship. Furthermore, a positive regression coefficient for the squared term indicated a U-shaped relationship, while a negative coefficient indicated an inverted U-shaped relationship.

Results

3.1 Effects of Temporal Distance on Negative Emotions

As shown in Table 1 , in the first incident, the number of days from the event significantly positively predicted the average word frequency of sadness, disgust, fear, and all emotion terms combined ($p < 0.05$), indicating that the longer the time since the event, the higher the intensity of individuals' negative emotions, particularly for sadness, disgust, and fear (Figure 1 [Figure 1: see original paper]). In the second incident, the number of days significantly positively predicted the average word frequency of anger ($p < 0.05$) and marginally positively predicted the average word frequency of sadness ($p = 0.063$), suggesting that as time passed after the incident, individuals' anger and sadness intensified (Figure 2 [Figure 2: see original paper]). Other predictive effects were not significant, but the overall trend showed that negative emotions generally intensified over time.

We summed the four types of negative emotions to examine the effect of temporal distance on overall negative emotion intensity. The results revealed that in the first incident, temporal distance significantly positively predicted overall negative emotion intensity ($p < 0.001$). In the second incident, temporal distance did not significantly predict overall negative emotion intensity, though Figure 3 [Figure 3: see original paper] shows that, except for the day of the event, overall negative emotion intensity increased with temporal distance.

In summary, through analysis of individuals' emotional intensity changes over

time following two negative events, we found that temporal distance positively predicted negative emotions; that is, within a one-week range after the event, individuals' negative emotions toward the event gradually intensified over time.

3.2 Effects of Spatial Distance on Negative Emotions

As shown in Table 2 , in the first incident, spatial distance significantly negatively predicted the average word frequency of anger ($p < 0.05$), indicating that greater distance from the event location was associated with lower anger intensity. The quadratic term of spatial distance significantly predicted disgust (Q = -0.028, $p < 0.05$), suggesting an inverted U-shaped relationship between geographic distance and disgust. As illustrated in Figure 4 [Figure 4: see original paper], disgust intensity initially increased with spatial distance, peaked, and then decreased.

In the second incident, the linear regression coefficient of spatial distance on sadness was significant (L = 0.064, $p < 0.05$), indicating that spatial distance positively influenced sadness—greater distance from the event location was associated with higher sadness intensity. The quadratic term of spatial distance marginally significantly predicted fear (Q = -0.035, $p < 0.1$), suggesting an inverted U-shaped relationship between spatial distance and disgust. As shown in Figure 2, disgust intensity initially increased with spatial distance, peaked, and then decreased. The quadratic term of spatial distance significantly predicted disgust (Q = -0.011, $p < 0.1$), again indicating an inverted U-shaped relationship; as shown in Figure 5 [Figure 5: see original paper], disgust intensity initially increased with spatial distance, peaked, and then declined.

Across both incidents, spatial distance significantly positively predicted the word frequency of all negative emotion terms ($p < 0.05$), indicating that greater distance from the event location was associated with higher overall negative emotion intensity.

Discussion

This study utilized Weibo user data to investigate the effects of two dimensions of psychological distance—temporal distance and spatial distance—on negative emotions elicited by the Didi female passenger victimization incidents.

Regarding temporal distance, results from both incidents were consistent: the longer the time since the Didi incident, the higher the intensity of individuals' negative emotions. These findings align with our research hypotheses, conforming to Construal Level Theory' s predictions about temporal distance effects on negative emotions from immoral events and the psychological typhoon eye effect' s temporal dimension predictions. Although regression results were not significant in the second incident, this was primarily due to the extremely high negative emotion intensity on the day of the event, which created an outlier that substantially impacted significance. Nevertheless, the overall trend showed that negative emotion intensity still increased with temporal distance after the second

incident. However, due to sampling error in this study, we cannot definitively determine whether negative emotion intensity was indeed highest on the day of the immoral event, significantly decreased 24 hours later, and then slowly increased again. Future research should increase sample size and reduce sampling error to investigate whether negative emotion intensity on the event day is consistent with our findings.

Regarding spatial distance, the trend of negative emotion intensity changes after both incidents was consistent: the greater the distance from the Didi incident location, the higher the intensity of individuals' negative emotions, which aligns with Construal Level Theory' s predictions about spatial distance effects on negative emotions from immoral events and the psychological typhoon eye effect' s spatial dimension predictions. However, analyzing specific dimensions of negative emotions revealed some differences from the overall trend. For anger, greater distance from the Didi incident location was associated with lower anger intensity, possibly because anger is more susceptible to interpersonal distance influence. Individuals may have stronger group identification with people in the same province, resulting in closer interpersonal distance with victims and a greater willingness to adopt the victim's perspective, thereby generating stronger anger. For disgust, spatial distance showed an inverted U-shaped relationship with disgust intensity; that is, when distance from the incident location reached a certain point, individuals' disgust gradually weakened, possibly because individuals too far away struggled to empathize with the victim' s experience, thus diminishing disgust intensity.

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Note: Figure translations are in progress. See original paper for figures.