

## Public Compensatory Control in Public Emergencies

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### Abstract

Compensatory control theory posits that when faced with a lack of perceived control, individuals exhibit a tendency to demand order—that is, they strive to seek order in the objective world and demonstrate preferences and needs for physical or abstract entities characterized by orderliness, certainty, and predictability. This phenomenon is referred to as compensatory control. Given that public emergencies often trigger a temporary decline in people's sense of control, the perspective of compensatory control theory can be employed to explain a series of typical psychological reactions exhibited by individuals during such events. For instance, conspiracy theory beliefs, rumor propagation, moral debates, and irrational hoarding can all be understood from the perspective of compensatory control and the need for order. Future research could more extensively consider exploring public psychological reactions during public emergencies from the compensatory control perspective, and strengthen theoretical deepening, research refinement, and practical interventions based on this viewpoint.

### Full Text

### Compensatory Control in Public Emergencies

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## Abstract

Compensatory control theory posits that when individuals experience a lack of control, they tend to seek order and structure in the world, showing preference and demand for order, certainty, and predictability in their social, physical, and metaphysical environments—a phenomenon termed compensatory control. Since public emergencies often threaten people's sense of control, the compensatory control perspective can be used to explain a series of typical psychological reactions among individuals during such events. Based on compensatory control theory, this article analyzes four typical responses (belief in conspiracy theories, spreading misinformation, focusing on moral judgment, and irrational hoarding) exhibited by the public during public emergencies and discusses the order-seeking mechanisms underlying them. We suggest that future studies should further explore people's psychological and behavioral responses in public emergencies from the perspective of compensatory control, and conduct deeper investigations at theoretical, empirical, and practical levels.

**Keywords:** public emergencies, compensatory control, need for structure, perceived control

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In the aftermath of public emergencies, why do rumors and conspiracy theories frequently proliferate in public discourse? And why do people blindly rush to purchase and hoard food and medicine in response to potential threats? The psychological mechanisms underlying these phenomena warrant careful examination. In recent years, psychological guidance and behavioral intervention for the general public during public emergencies have gained increasing attention from government agencies and academic researchers. Helping the public maintain a relatively rational and calm social mentality to facilitate crisis management has become an important issue in emergency response and prevention efforts (e.g., Wang Dengfeng, 2020; Yang Yufang & Guo Yongyu, 2017).

To effectively guide the public, we must first thoroughly investigate and understand their psychological and behavioral reactions during such events, clarifying the underlying psychological principles (e.g., Van Bavel et al., 2020). Accordingly, this article adopts the perspective of compensatory control theory, using the decline in individuals' sense of control caused by public emergencies as a logical starting point, and examines the psychological mechanism of individuals' need for order to analyze and understand typical psychological and behavioral manifestations of the public during public emergencies. This approach provides a relatively new theoretical framework for exploring psychological issues in related fields and offers insights for guiding public mentality during public emergencies.

## 2.1 Basic Tenets of Compensatory Control Theory

Compensatory control theory focuses on the psychological compensation mechanisms when individuals experience a lack of perceived control—the general perception of one’s ability to influence the external world and the extent to which one is constrained by external forces (Lachman & Weaver, 1998). The theory posits that the need for control is a fundamental human need; people must perceive that they can control external events and their own lives to understand the rules of the world and maintain a sense of security and certainty in social life. However, compensatory control theory also emphasizes that people live in a realistic and uncertain society, where this need for control is not always satisfied. When facing sudden accidents, individuals often experience a decline or lack of control, perceiving a loss of order and certainty, along with anxiety arising from unpredictable prospects (Kay et al., 2009). In response, compensatory control theory suggests that people do not simply allow their anxiety to escalate when lacking control; instead, they seek psychological compensation (often unconsciously), with the core of this compensation being the need for order (e.g., Kay et al., 2008, 2009).

In this theoretical framework, “order” broadly refers to any social or physical entity that brings orderliness, certainty, and predictability to individual cognition (e.g., Landau et al., 2015; Bai Jie et al., 2017). Specifically, when facing a lack of control, individuals exhibit a tendency to seek order in the objective world, showing preference and demand for physical or abstract things that are orderly, certain, and predictable. This manifestation is called compensatory control (Kay et al., 2009; Landau et al., 2015). Thus, the core proposition of compensatory control theory is that when individuals’ sense of control declines or is threatened for any reason, they exhibit various forms of compensatory control, with the underlying logic being the search for some objective orderliness as compensation in an environment of uncertainty and lack of control.

Previous research has identified many such order-demand reactions resulting from decreased control. For example, when experimentally depriving participants of control, studies found that these participants, compared to control groups, were more likely to perceive orderliness and regularity in visual images they viewed (Whitson & Galinsky, 2008); preferred deterministic work environments over ambiguous ones (Ma & Kay, 2017); showed greater preference for products that provide order and controllability in their lives and were willing to spend more on them (e.g., Lembregts & Pandelaere, 2019; Shepherd et al., 2011; Wu & Liu, 2020); and also preferred political candidates who emphasized providing social order rather than change (e.g., Kay et al., 2008). Behind these various manifestations lies the fact that individuals lacking control have a stronger need for order, regularity, certainty, and controllability, regardless of whether these exist at the level of objective physical attributes, abstract living environments, or specific commodities or people.

## 2.2 Potential Connections Between Public Psychology in Public Emergencies and Compensatory Control Theory

In recent years, compensatory control theory has been introduced into an increasing number of social psychological research domains, demonstrating broad explanatory power. Regarding psychological issues related to public emergencies, although current research in this area has rarely employed this perspective, applying the compensatory control framework to examine public psychological and behavioral reactions during such events reveals that it can largely explain relevant psychological phenomena. When facing crises and uncertainties brought by public emergencies, the public's immediate experience is often a decline in their sense of control (Fritzsche et al., 2017; Kakkar & Sivanathan, 2017), with their previously assumed ability to fully control their social life rhythms being disrupted and their personal sense of security threatened (Chou et al., 2016). This aligns perfectly with the logical starting point emphasized by compensatory control theory—the lack of control (Landau et al., 2015; Bai Jie et al., 2017). Moreover, sudden crises often cause widespread public anxiety (Wei et al., 2017; Wen Fangfang et al., 2020), and the key trigger for compensatory control and order demand emphasized by the theory is also individuals' need to alleviate anxiety (Kay et al., 2009, 2010b), sharing the same psychological foundation. Additionally, the public exhibits various situational reactions at multiple levels during public emergencies (e.g., Van Bavel et al., 2020), and the order-demand manifestations described by compensatory control theory also include various psychological and behavioral stress responses (Kay & Eibach, 2013; Landau et al., 2015). Previous research has also found that some behaviors of people in crisis and uncertain states can be explained through compensatory control (Fritzsche et al., 2017; Kakkar & Sivanathan, 2017). Therefore, compensatory control theory may serve as an effective theoretical perspective for understanding the psychological and behavioral reactions of the general public during public emergencies.

After theoretically identifying the connection between public emergencies and compensatory control theory, we must also conceptually delimit the scope, as not all public emergencies affect people's sense of control and trigger compensatory control reactions. Objectively, according to China's 2006 "National Overall Emergency Plan for Public Emergencies," public emergencies refer to four types of events that occur suddenly, cause or may cause serious social harm, and require emergency response measures (natural disasters, accidental disasters, public health events, and social security events). Subjectively, what psychological researchers pay more attention to behind public emergencies is the variable of safety threat—the perceived potential threat to one's physical safety (Li et al., 2020). In other words, psychological research on public emergencies often focuses not on the events themselves but on the threats to individual safety they bring (e.g., Brambilla et al., 2013). Of course, during public emergencies, this perception of safety threat is not uniform across individuals. The scope of such research generally focuses neither on direct victims nor on completely

unaffected populations, but on those who perceive safety threats but have not yet been harmed. For unaffected populations, there is no safety threat and thus no psychological reaction to speak of; for directly harmed populations, they face not just “threat” but actual damage. Therefore, this article limits its focus to public emergencies that pose safety threats to the public beyond direct victims, with those perceiving safety threats being our target population. We believe that discussing compensatory control under this premise and scope is more appropriate, and compensatory control theory demonstrates better applicability. Meanwhile, under this definition, different types of events become homogeneous—for example, whether public health emergencies or mass incidents, they are of the same nature in terms of posing safety threats to affected populations and similarly trigger declines in personal control and activation of compensatory control processes.

Based on this, the following sections will further analyze the compensatory control mechanisms behind four typical psychological and behavioral manifestations of the public during public emergencies, integrating relevant empirical research findings. We do not claim that compensatory control theory can explain all public psychological and behavioral reactions during public emergencies, nor that these manifestations can only be understood through compensatory control, nor that compensatory control phenomena only occur in the context of public emergencies. However, we contend that for some typical irrational psychological and behavioral tendencies exhibited by the public during public emergencies, compensatory control theory can provide an explanatory angle that previous research has rarely considered. Through this perspective, future research can better reveal public psychological trends in such events while uncovering the underlying psychological processes and mechanisms, thereby offering insights for research and governance practices related to psychological issues in crisis management.

### 3.1 Conspiracy Theory Thinking: The Search for Causal Order

When public emergencies occur, people hope to acquire effective knowledge about the causes of events and construct a reasonable causal explanation. This is a natural reaction for understanding the external world, recognizing social phenomena, and hoping to control one’s own life. However, due to the suddenness, randomness, and complexity of public emergencies, governments, media, and academic researchers often cannot immediately provide definitive answers about causes. At such times, conspiracy theories tend to emerge and spread rapidly within certain circles, attracting many believers (van Prooijen & Douglas, 2018). This phenomenon is particularly typical in the new media era, where many unfounded speculations about event causes become hot topics online. Yet these unsubstantiated claims often lead to public misunderstanding of emergencies, negatively affecting public opinion and post-event emergency management.

Conspiracy theories are viewpoints and assertions that attribute certain social or political events to the secret plotting of a few powerful, malicious groups, organizations, or individuals (Green & Douglas, 2018). Unlike confirmed conspiracies, conspiracy theories focus on the potential existence of a conspiracy, often attributing the source of events not to natural laws but to organized, planned secret actions by a small minority. Crucially, the reasoning behind conspiracy theories is often not based on rigorous logic but rather on forced interpretations of minor details that produce seemingly plausible but incomplete evidentiary chains (Douglas & Sutton, 2018; Mao Jiayan et al., 2021). Previous theoretical explanations for this psychological tendency have approached it from a cognitive perspective, suggesting that intuitive thinking (e.g., Norris & Epstein, 2011) and habitual cognitive biases (e.g., Brotherton & French, 2014) can make people more susceptible to conspiracy theories, with research also finding negative correlations between education level and conspiracy theory beliefs (van Prooijen et al., 2015). However, attributing conspiracy theory thinking solely to individual cognitive deficiencies seems incomplete. Recent researchers increasingly explain conspiracy theory beliefs from motivational and need-based perspectives (Douglas et al., 2017). For ordinary citizens, adherence to conspiracy theories more likely stems from deeper psychological causes, and compensatory control theory identifies the order need as the psychological foundation behind such beliefs (Sullivan et al., 2010; Mao Jiayan et al., 2019).

From the perspective of compensatory control theory, believing in conspiracy theory explanations for public emergencies may result from the public's need to acquire causal regularities about event origins. In compensatory control, the core of individual order need lies in perceiving cognitive regularity, certainty, and predictability, and discussions about event causality certainly fall within this "order" category, representing an extremely important source of order (Sullivan et al., 2010). For the public whose sense of control is threatened by emergencies, once this causal order is absent or questionable, they must explore and seek compensation through other channels. Therefore, on one hand, people tend to pay extensive attention to relevant explanations online, actively discussing and forwarding them; on the other hand, they adopt a more credulous attitude toward various possible explanations. Although many conspiracy theory explanations are far-fetched and lack rigorous logical argumentation, they at least provide a seemingly plausible account. Before official investigation conclusions are released, many people would rather believe these conspiracy theories to compensate for their needed causal order—preferring this to continuing to endure the anxiety brought by world uncertainty and lack of control (van Prooijen & Acker, 2015). Previous research has provided empirical support for this effect, finding that when experimental manipulations temporarily threaten individuals' sense of control, they show stronger tendencies to believe in conspiracy theories (Sullivan et al., 2010). When people's sense of control is enhanced, their conspiracy theory thinking levels significantly decrease (Whitson et al., 2019). Research based on Chinese samples has also found negative correlations between individuals' control levels and their adoption of conspiracy theories—

the lower the control, the more inclined they are to believe conspiracy theory explanations for major events (Mao et al., 2020).

Additionally, conspiracy theories sometimes remain prevalent even after scientific explanations have been proposed. Previous research can explain this from three aspects. First, scientific explanations often require rigorous demonstration and take time to be proposed by scientists, creating a “blank period for scientific explanation” during which conspiracy theories can take advantage and be accepted and spread by some. When scientific conclusions are reached, conspiracy theories may have already occupied part of public opinion, making them difficult to refute (Jolley & Douglas, 2017). Second, the core of compensatory control is acquiring order—clear, simple, predictable, and certain patterns—whereas scientific conclusions often contain some uncertainty. Using COVID-19 as an example, saying it originated from nature involves randomness, whereas the “man-made theory” is simpler, more certain than random, and more controllable—controlling a few specific people is easier than controlling uncertain nature. Compensatory control research has also found that individuals in uncontrollable environments are more inclined to find scapegoats for negative events (Rothschild et al., 2012), reflecting the same psychological mechanism. Third, conspiracy theories have the characteristic of incorporating scientific explanations and other anti-conspiracy arguments into the conspiracy theory itself (Lewandowsky et al., 2013)—conspiracy theorists claim that scientists were bribed by conspirators to produce false reports. Thus, conspiracy theories are unfalsifiable, and this unfalsifiability makes them appear more logically complete with fuller causal chains (Sullivan et al., 2010), further satisfying people’s need for order. In summary, from the compensatory control perspective, the psychological root of conspiracy theory thinking during public emergencies may be the need for causal order resulting from threatened control.

### 3.2 Rumor Adoption: The Search for Information Order

In addition to conspiracy theories, public crises often become breeding grounds for rumor generation and dissemination. While conspiracy theories focus more on event origins (van Prooijen, 2020), rumors mostly point to current situations and future developments (DiFonzo, 2010). Moreover, conspiracy theories are generally treated as possibilities—even proponents typically present them as speculation rather than fact (van Prooijen & Douglas, 2018)—whereas rumor transmission usually presents them as facts or conclusions (DiFonzo et al., 2013). Therefore, although conspiracy theories can be broadly considered a form of rumor, most rumors have different characteristics and manifestations for these two reasons. When a major emergency significantly impacts public life order or personal control, many people constantly refresh news through networks and media to gain more immediate information about the event. Often, in the massive amount of information related to emergencies, people ignore authenticity verification, allowing rumors, fake news, or pseudoscientific ideas to take advantage. Since rumor adoption is not entirely based on rational cog-



nitive processes, simply debunking rumors through scientific explanation often has limited effect (King & Leask, 2017). Therefore, blocking the psychological basis for rumor generation, dissemination, and adoption is essential in public emergency information communication.

Previous psychological research has examined factors influencing rumor belief and transmission from different angles, including rumor contexts (e.g., DiFonzo, 2010), content (Pezzo & Beckstead, 2006), and characteristics of transmitters and receivers (e.g., Lewandowsky et al., 2012), all found to affect rumor tendencies (Peng Xiaozhe et al., 2018). However, theoretical explanations from motivational and need-based perspectives await further development, and compensatory control theory can fill this gap to some extent. From this theoretical perspective, the key reason people tend to believe and spread rumors in public crisis situations is the hope of obtaining sufficient information to defend against the uncertain impacts of emergencies, with the mechanism again being information order demand triggered by lack of control. In public health emergencies, for example, threatened people first face uncontrollable life situations, generating anxiety about personal safety or future development (Zhen Rui & Zhou Xiao, 2020). To alleviate anxiety, they urgently seek the latest scientific research and news about epidemic prevention, hoping that sufficient certain information will enable successful response to the public health event and restore certainty to their future. Domestic research has shown that higher public risk perception of crisis events leads to greater intentional and unintentional rumor transmission (Hu Wei et al., 2020). Similar to conspiracy theory generation, whether this information order demand translates into rumor adoption and transmission depends on whether correct information emerges promptly—if authoritative channels cannot temporarily provide information order, rumors will generate and spread extensively. Although rumor information does not represent real order, rumors often cloak themselves in scientific garb or truth-like lies, allowing panicked public to temporarily obtain seemingly reliable information that fills the psychological void of information order (Axt et al., 2020).

Previous compensatory control research has revealed an interesting phenomenon: when environments threaten individuals' sense of control, leading to its decline, people show two seemingly contradictory compensatory control manifestations—some studies find increased belief in science (Rutjens et al., 2013), while others find increased superstition (Greenaway et al., 2013). These seemingly contradictory phenomena are easily unified under compensatory control theory: the key is not whether it's science or superstition, but which explanation makes control-deprived people feel sufficient information order. In other words, both scientific conclusions and superstitious rumors can serve the function of "providing order" (Landau et al., 2015). Therefore, during public emergencies, efforts should be made to ensure that accurate, authoritative scientific information occupies the "high ground" of public information demand earlier, satisfying the information order needs of control-deprived people—likely achieving better public opinion guidance than debunking rumors after widespread dissemination.



### 3.3 Moral Debates: The Search for Value Order

People in public emergencies also show stronger concern for moral issues. For example, news reports about emergencies on the internet sometimes easily transform into moral debates, as the public seems more inclined to understand and judge relevant figures and events from moral perspectives, and the moral standards they uphold tend to be stricter. Some domestic and foreign studies provide evidence for this tendency. Shi Huiyue et al. (2020) surveyed the importance Chinese university students attached to various values during the COVID-19 pandemic, finding that social values ranked at the top level, showing high concern for social morality with clear manifestations of collectivism and social responsibility. Experimental research also found that during the pandemic, Chinese participants made harsher judgments about doctors' immoral behavior (Pan Feng et al., 2020). While these phenomena are understandable, as social values diversify and consensus on evaluation scales becomes difficult to achieve, individuals' high attention to moral issues and strict judgments can easily evolve into opinion polarization, eventually leading to attitude extremes and group divisions through online platform amplification. For instance, U.S. research shows that since the COVID-19 outbreak, moral stigmatization and discrimination against Asian groups have significantly increased (Croucher et al., 2020), demonstrating the social problems that may derive from heightened moral concern during public emergencies.

Therefore, it is necessary to explore the psychological mechanisms behind this phenomenon from basic research to guide it effectively. According to compensatory control theory, the public's heightened attention to moral phenomena and strong defense of certain values essentially still reflects the need and demand for order, because these moral debates are about values, and values are also an important social order (Goode et al., 2014). From a psychological perspective, values are evaluation standards for the meaning and utility of things and behaviors, and are core factors that drive and guide people's decision-making and actions (Xu Yan, 1999). Therefore, the moral and value system can be said to be an important order guarantee in social life. When personal control decreases during public emergencies, people naturally tend to obtain order compensation from moral and value judgments. Previous research has found that when participants' control is reduced, they more strongly maintain objective moral standards (Stanley et al., 2020) and more firmly believe in their own belief systems (de Leon & Kay, 2020). Other studies show that when placed in changing, uncertain situations, participants are more inclined to harshly punish those who violate certain moral value criteria (Ding & Savani, 2020). Thus, the internal psychological mechanism behind people's tendency to focus on moral issues and debate right from wrong during public emergencies may be the value order compensation demand triggered by lack of control.

It should be noted that compensatory control theory may not be the only theoretical perspective that can explain the public's moral concern during public emergencies. Terror management theory and the uncertainty management

model can also provide theoretical insights. Terror management theory proposes that after receiving mortality salience, people more strongly maintain and emphasize their worldviews as a strategy to resist death anxiety (e.g., Burke et al., 2010; Meng Xianghan et al., 2021). The uncertainty management model similarly emphasizes that when experiencing uncertainty, individuals support people or views consistent with their worldviews and reject those that threaten their worldviews (e.g., Van den Bos et al., 2006). Since safety threats from public emergencies also bring uncertainty experiences and even trigger mortality salience, these two theories can also provide reasonable motivational explanations. However, compensatory control theory shows better theoretical explanatory power and more relevant research evidence for the other irrational manifestations discussed in this article, so our analysis focuses primarily on the compensatory control perspective.

### 3.4 Irrational Hoarding: The Search for Internal Order

Besides the above manifestations, another typical public behavior during public emergencies is irrational panic buying and hoarding of daily necessities or protective materials—a phenomenon commonly observed in our lives. Those who secure essential supplies sometimes fail to use them efficiently, causing waste, while those unable to obtain them experience increased panic, potentially triggering new rounds of frenzied hoarding and further market chaos. Research shows that people's behavior during such emergencies often follows a zero-sum thinking pattern, believing they are in competition with others in society—others' gains necessarily mean their losses (Meegan, 2010). However, for many public emergencies, this zero-sum thinking is wrong and harmful. Using epidemic prevention as an example, if some individuals hoard large amounts of protective materials (e.g., masks) leaving many others without adequate protection, this actually increases infection risk even for those who hoarded supplies (Folch et al., 2003). Therefore, these irrational consumption behaviors often inadvertently increase public risk and cost.

Researchers have tended to interpret irrational hoarding from the perspective of need satisfaction. Tolin (2011) found that people with pathological hoarding tendencies reported that material acquisition could alleviate negative emotions, and other scholars proposed that hoarding could compensate for early attachment relationship deficiencies (e.g., Kyrios et al., 2017). These studies established the approach of exploring hoarding behavior from the perspective of deficiency needs. Building on this, compensatory control theory can provide a motivational explanation for individuals' irrational hoarding tendencies during public emergencies. From this perspective, the psychological factor triggering public irrational hoarding in crisis situations can be partially attributed to the desire to satisfy internal order needs through excessive resource possession when control is insufficient—that is, a manifestation of compensating for external world order deficiency through enhanced internal order.

In normal social order, adequate material supply and good market rules are

important sources of certainty and security in people's lives (Gasiorowska & Zaleskiewicz, 2021). Purchasing and accumulating necessary living materials to ensure normal life order is completely normal material demand. However, during public emergencies, individuals perceive the sudden loss of conventional external world order and threats to personal control, requiring more internal order factors as security guarantees. Only by hoarding items as much as possible can they more easily construct definite, safe, and predictable patterns at the psychological level. Previous research also indicates that individuals' hoarding tendencies partly stem from excessive worry about future uncertainty caused by lacking certain items (Oglesby et al., 2013). This exceeds normal material demand and requires understanding from the perspective of psychological need satisfaction. Researchers from the compensatory control perspective have not limited themselves to theoretical discussion but have also found supporting evidence in empirical studies. Research shows that low-control participants are more inclined to purchase products that provide order in their lives compared to high-control participants (Cutright, 2012). Similar studies find that control-deprived participants are more likely to pursue orderly experiences in consumption (Shepherd et al., 2011). Another study examined participants' different tendencies toward purchasing utilitarian versus hedonic products, finding that low-control participants preferred utilitarian products because they more directly solve life problems (Chen et al., 2017). Domestic researchers have also found that Chinese university students' intolerance of uncertainty (meaning higher need for order) can predict their hoarding behavior—the less able they are to tolerate uncertainty, the more they tend to exhibit excessive hoarding purchasing behavior (Zhang Xu et al., 2020). These evidences collectively indicate that public irrational panic buying and hoarding during emergencies can be understood to some extent as a compensatory control reaction, representing individuals' turn to internal order compensation due to perceived lack of external environmental order.

#### **4 Applicability of Compensatory Control Theory for Explaining Public Mentality During Public Emergencies**

The above sections have discussed from four aspects that applying compensatory control theory to analyze typical public psychological manifestations during public emergencies has strong explanatory power. Of course, this perspective is only one way to theoretically understand the issue, and we should recognize that some similar theories can also explain these phenomena. For instance, the aforementioned terror management theory and uncertainty management model, along with another related theoretical perspective—the meaning maintenance model (Heine et al., 2006)—can all provide frameworks for understanding similar phenomena. However, based on existing literature, empirical research grounded in compensatory control theory better covers all four aspects discussed above, while each of the other three theories has certain limitations or controversies, which constitutes the reason for our primary focus on compensatory control theory.

Terror management theory is the earliest and longest-studied motivational compensation theory among these, with considerable influence. It emphasizes that mortality salience-induced death thought accessibility triggers individual anxiety, leading to three typical compensatory reactions: worldview defense, self-esteem seeking, and close relationships (e.g., Burke et al., 2010). However, terror management theory faces considerable controversies (Meng Xianghan et al., 2021), such as the difficulty of summarizing the three “compensatory” reactions into a unified pattern, with the scope of compensatory reactions continuing to expand, creating a circular argument tendency and rendering the theory somewhat unfalsifiable (Martin & van den Bos, 2014).

The uncertainty management model emphasizes similar compensatory outcomes as terror management theory—worldview defense—but focuses on uncertainty activation as the antecedent triggering compensation, with individual uncertainty salience causing anxiety that ultimately leads to worldview defense (e.g., Van den Bos et al., 2006). Since death also triggers uncertainty, some scholars tend to view mortality salience effects as a form of uncertainty management model (Yin Rong, 2010). Therefore, if terror management theory has limited explanatory power for the typical reactions discussed above, the uncertainty management model, with only “worldview defense” as its pattern, also cannot well explain manifestations like conspiracy theory thinking.

The meaning maintenance model, proposed relatively later among these theories, attempts to integrate all motivational compensation processes using a more abstract concept. It proposes a more generalized antecedent called meaning violation, referring to any experience inconsistent with individual expectations, which triggers various forms of compensatory reactions (Heine et al., 2006). Although the meaning maintenance model can indeed encompass other motivational compensation theories to some extent, its theoretical perspective is too comprehensive, leading to overly general exposition. For example, its core concept of “meaning” is relatively ambiguously defined (Zuo Shijiang et al., 2016), and like terror management theory, its emphasized “compensation” lacks a unified pattern, including five forms: assimilation, accommodation, affirmation, abstraction, and assembly. This makes its theoretical system too generalized and less precise for explaining specific issues.

Compared with these theories, compensatory control theory has four advantages. First, the antecedent of compensation is clear—lack of control. As a basic human need, the gain and loss of control is a recurring process in life, making the theory widely applicable. Second, the compensation pattern is relatively unique and specific—order need. Compensating for control through seeking order has clear independent and dependent variables, making it easier to target specific problems. Third, research conclusions are consistent. Landau et al. (2015) conducted a meta-analysis of 55 studies on compensatory control effects, finding consistent effects of control deprivation triggering order need, and research based on Chinese samples also supports compensatory control theory (Mao et al., 2020; Rao et al., 2022; Wang Yanli et al., 2017), demonstrating cross-cultural consis-

tency. Fourth, and most importantly, compensatory control theory shows good explanatory power for all four aspects of irrational behavior discussed in this article. Therefore, for understanding such social psychological phenomena, we believe compensatory control theory demonstrates broader, more appropriate, and more direct applicability. Of course, we do not exclude the theoretical and applied value of the other theories mentioned, nor deny that compensatory control theory has its limitations, but given our focus, we concentrate our discussion on compensatory control theory.

## 5.1 Summary

Providing positive guidance for public psychology and behavior during public emergencies is significant, and such guidance must be based on clear understanding of relevant psychological mechanisms. Based on the above introduction and analysis, many seemingly irrational manifestations of the general public during public emergencies actually have underlying deep logic. Particularly when interpreted through compensatory control theory, individuals' search for order may be the common formation mechanism behind these manifestations. Therefore, the compensatory control perspective may deserve more attention from researchers examining the series of irrational psychological and behavioral tendencies exhibited by the public during public emergencies, which has outstanding theoretical value for both understanding such public mentality and for compensatory control theory itself.

On one hand, compensatory control theory can make unique contributions to examining public reactions during public emergencies. Taking psychological research based on the COVID-19 pandemic as an example, although psychologists have published numerous studies on this issue, overall, research revealing psychological phenomena predominates while research uncovering psychological mechanisms is relatively scarce, particularly lacking systematic theoretical explanations. This requires the involvement of more theoretical systems, including compensatory control theory, to provide specific frameworks and models for better revealing the mechanisms behind public psychological phenomena. This does not mean compensatory control theory is the only applicable theoretical perspective; other theoretical angles mentioned earlier can also provide understanding frameworks. On the other hand, exploring irrational behavior during public emergencies from the compensatory control perspective has important developmental significance for the theory itself. Since its proposal (Kay et al., 2008, 2009), most research evidence for compensatory control theory has come from laboratory studies where researchers temporarily deprive participants of control to reveal various order-need phenomena (Landau et al., 2015). Although some recent studies have examined compensatory control effects triggered by control threats in more realistic contemporary contexts (e.g., Fritzsche et al., 2017; Kakkar & Sivanathan, 2017), such studies remain a small proportion in this field. Based on our analysis, compensatory control theory has broad explanatory power for understanding irrational mentality during public

emergencies. Therefore, future research combining public emergencies to further explore compensatory control theory's manifestations and patterns in real social contexts has good theoretical value for the theory's development, enrichment, and improvement. Based on this theoretical value, research can also help emergency management departments conduct targeted psychological guidance and intervention during public emergencies based on control enhancement and order assurance, further demonstrating its practical significance.

## 5.2 Outlook: Issues Requiring Further Exploration

First, at the theoretical level, future research needs to further explore the explanatory depth of compensatory control in public emergencies, providing more detailed and refined descriptions of the effect of control deprivation triggering order need based on fundamental compensatory control theory and combined with different types and attributes of public emergencies. Currently, when explaining specific compensatory control phenomena, the theory does not distinguish between different types of order-need phenomena but uses the same generalized order-need concept to explain different compensatory control manifestations (Landau et al., 2015), which may be insufficient for practice. Meanwhile, similar theoretical perspectives like terror management theory, uncertainty management model, and meaning maintenance model also deserve future research attention, with researchers flexibly selecting the most appropriate theoretical perspective and explanatory framework based on specific issues. Although this article focuses on analyzing the compensatory control perspective and emphasizes its theoretical value and applicability, we do not exclude that the above-mentioned related theories can all provide unique theoretical contributions in this field. Some scholars have attempted to integrate different theoretical perspectives including compensatory control theory, terror management theory, uncertainty management model, and meaning maintenance model to extract more universal theories about individuals' motivational compensation when facing threats (Proulx et al., 2012; Xu & McGregor, 2018). These issues may require more theoretical innovation attempts and empirical research advancement in the future.

Second, at the empirical level, besides more extensively examining specific manifestations of public compensatory control during public emergencies, future research should conduct in-depth exploration from both methodological and target perspectives. Methodologically, current conclusions mostly come from laboratories or cross-sectional correlational studies, which still have some distance from real situations. Future research can combine specific public emergencies with field investigations, big data, or cognitive neuroscience techniques to reveal this issue systematically at multiple levels. In terms of research targets, future studies need to examine more boundary conditions for compensatory control effects, exploring under what situations and conditions which groups are more prone to compensatory control and under what circumstances such reactions can be relatively avoided. Some recent studies have begun attempts in this regard, such as

Noordewier and Rutjens (2021) finding that participants with higher personal need for structure react more strongly to loss of control, and Blair (2020) finding that individuals with higher internal control at the personality level show weaker compensatory control tendencies when experiencing control deprivation. More potential moderating effects of personality traits or situational factors can be incorporated into this research area in the future, which is important for deeply and detailedly understanding compensatory control phenomena in public emergencies.

Finally, at the practical level, future scholars and social governance practitioners can explore possible intervention and guidance strategies based more on the compensatory control perspective. The above analysis shows that many psychological and behavioral manifestations of the public during public emergencies are intended to acquire order, and their seemingly irrational behaviors actually have rationality at the psychological level. Theoretically, these compensatory control manifestations can be intervened through other order satisfaction approaches. Compensatory control theory has proposed that if participants can obtain order from other channels, certain specific compensatory control manifestations will weaken when they lose control (Kay et al., 2010a; Landau et al., 2015). For example, Cutright (2012) found that low-control participants obtained order compensation by preferring products with clear boundaries, but also found that for individuals with strong religious beliefs, their preference for specific product orderliness was less strong because they could obtain order from religion. That is, individuals' compensation for control during public emergencies does not necessarily have to seek order from conspiracy theories, rumors, or hoarding. If crisis management can ensure public order needs from other aspects as much as possible, it may successfully change their some irrational tendencies and achieve guidance and leadership in public social mentality. This intervention approach needs more attempts in future research and practice to better reflect psychology's practical value in serving social governance.

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## References

- Bai, J., Guo, Y. Y., & Yang, S. L. (2017). What happens after people lose control? Revelations from compensatory control theory. *Chinese Journal of Clinical Psychology*, 25(5), 982-985, 981.
- Hu, W., Wang, Q., Chen, H. L., & Jiang, Y. H. (2020). The relationship between public risk perception and unintentional/intentional rumor spreading during COVID-19: The mediating role of negative emotions. *Chinese Journal of Clinical Psychology*, 28(4), 734-738.
- Mao, J. Y., Guo, Y. Y., & Yang, S. L. (2021). The generation mechanism of conspiracy theory beliefs—Three explanations from a social cognitive perspective. *Psychological Science*, 44(1).
- Mao, J. Y., Yang, S. L., & Guo, Y. Y. (2019). Motivations for believing in



conspiracy theories and intervention methods. *Chinese Journal of Clinical Psychology*, 27(3), 623-627, 629.

Meng, X. H., Li, Q., Zhou, Y. B., & Wang, J. (2021). Controversies in terror management theory and their implications for death psychology research. *Advances in Psychological Science*, 29(3).

Pan, F., Xu, K. P., Xu, Y., & Cui, L. J. (2020). A study on university students' moral judgment of doctors' role behavior under the impact of COVID-19. *Psychological Exploration*, 40(2), 111-116.

Peng, X. Z., Cui, F., Jiao, C., & Li, H. (2018). Situational, content, and communicator/receiver characteristics of rumor transmission and related cognitive neuroscience research. *Psychological Science*, 41(4), 916-921.

Shi, H. Y., Jiao, L. Y., Gao, S. Q., Yu, M. K., Xu, Y., Jiang, J., Wang, F. (2020). Exploration of university students' value characteristics and change trends during COVID-19. *Psychological Exploration*, 40(2), 105-110.

Wang, D. F. (2020). "Cool" reflections after the "hot" battle of psychological assistance in response to COVID-19. *Psychological Science*, 43(3), 514-518.

Wang, Y. L., Guo, Y. Y., & Yang, S. L. (2017). The relationship between family social class and need for structure: A compensatory control theory perspective. *Chinese Journal of Clinical Psychology*, 25(2), 371-373, 377.

Wen, F. F., Ma, S. H., Ye, H. X., Qi, Y., & Zuo, B. (2020). "Ripple effect" and "psychological typhoon eye effect" : A dual-perspective test of risk perception and anxiety among people in areas with different COVID-19 severity levels. *Acta Psychologica Sinica*, 52(9), 1087-1104.

Xu, Y. (1999). Research on Beijing university students' values and educational suggestions. *Educational Research*, (5), 33-38.

Yang, Y. F., & Guo, Y. Y. (2017). The role of psychology in social governance. *Bulletin of Chinese Academy of Sciences*, 32(2), 107-112.

Yin, R. (2010). The uncertainty management model perspective on mortality salience effects: Debates and integration. *Advances in Psychological Science*, 18(11), 1747-1755.

Zhang, X., Zhang, S. C., Sun, W., Wang, L., Song, L. T., Zhao, J. F., & Liu, Y. (2020). The relationship between intolerance of uncertainty and hoarding behavior in university students: A moderated mediation model. *Chinese Journal of Clinical Psychology*, 28(4), 773-778.

Zhen, R., & Zhou, X. (2020). A study on factors influencing ordinary people's anxiety during COVID-19. *Applied Psychology*, 26(2), 99-107.

Zuo, S. J., Huang, N. W., Wang, F., & Cai, P. (2016). The meaning maintenance model: Theoretical development and research challenges. *Advances in Psychological Science*, 24(1), 101-110.

- Axt, J. R., Landau, M. J., & Kay, A. C. (2020). The psychological appeal of fake-news attributions. *Psychological Science*, 31(7), 848-857.
- Blair, S. (2020). How lacking control drives fluency effects in evaluative judgment. *Organizational Behavior and Human Decision Processes*, 156, 97-112.
- Brambilla, M., Sacchi, S., Pagliaro, S., & Ellemers, N. (2013). Morality and intergroup relations: Threats to safety and group image predict the desire to interact with outgroup and ingroup members. *Journal of Experimental Social Psychology*, 49, 811-821.
- Brotherton, R., & French, C. C. (2014). Belief in conspiracy theories and susceptibility to the conjunction fallacy. *Applied Cognitive Psychology*, 28(2), 238-248.
- Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and Social Psychology Review*, 14(2), 155-195.
- Chen, C. Y., Lee, L., & Yap, A. J. (2017). Control deprivation motivates acquisition of utilitarian products. *Journal of Consumer Research*, 43(6), 1031-1047.
- Chou, E. Y., Parmar, B. L., & Galinsky, A. D. (2016). Economic insecurity increases physical pain. *Psychological Science*, 27(4), 443-454.
- Croucher, S. M., Nguyen, T., & Rahmani, D. (2020). Prejudice toward Asian Americans in the COVID-19 pandemic: The effects of social media use in the United States. *Frontiers in Communication*, 5, 39.
- Cutright, K. M. (2012). The beauty of boundaries: When and why we seek structure in consumption. *Journal of Consumer Research*, 38(5), 775-790.
- de Leon, P. R., & Kay, A. C. (2020). Political ideology and compensatory control mechanisms. *Current Opinion in Behavioral Sciences*, 34, 112-117.
- DiFonzo, N. (2010). Ferreting facts or fashioning fallacies? Factors in rumor accuracy. *Social and Personality Psychology Compass*, 4(11), 1124-1137.
- DiFonzo, N., Bourgeois, M. J., Suls, J., Homan, C., Stupak, N., Brooks, B. P., ... & Bordia, P. (2013). Rumor clustering, consensus, and polarization: Dynamic social impact and self-organization of hearsay. *Journal of Experimental Social Psychology*, 49(3), 378-399.
- Ding, Y., & Savani, K. (2020). From variability to vulnerability: People exposed to greater variability judge wrongdoers more harshly. *Journal of Personality and Social Psychology*, 118(6), 1101-1117.
- Douglas, K. M., & Sutton, R. M. (2018). Why conspiracy theories matter: A social psychological analysis. *European Review of Social Psychology*, 29(1), 256-298.

- Douglas, K. M., Sutton, R. M., & Cichocka, A. (2017). The psychology of conspiracy theories. *Current Directions in Psychological Science*, 26(6), 538–542.
- Folch, E., Hernandez, I., Barragan, M., & Franco-Paredes, C. (2003). Infectious Diseases, Non-Zero-Sum Thinking, and the Developing World. *The American Journal of the Medical Sciences*, 326(2), 66–72.
- Friesen, J. P., Kay, A. C., Eibach, R. P., & Galinsky, A. D. (2014). Seeking structure in social organization: Compensatory control and the psychological advantages of hierarchy. *Journal of Personality and Social Psychology*, 106, 590–609.
- Fritsche, I., Moya, M., Bukowski, M., Jugert, P., de Lemus, S., Decker, O., ... & Navarro Carrillo, G. (2017). The great recession and group based control: Converting personal helplessness into social class in group trust and collective action. *Journal of Social Issues*, 73(1), 117–137.
- Gasiorowska, A., & Zaleskiewicz, T. (2021). Trading in search of structure: Market relationships as a compensatory control tool. *Journal of Personality and Social Psychology*, 120(2), 300–334.
- Goode, C., Keefer, L. A., & Molina, L. E. (2014). A compensatory control account of meritocracy. *Journal of Social and Political Psychology*, 2(1), 313–334.
- Green, R., & Douglas, K. M. (2018). Anxious attachment and belief in conspiracy theories. *Personality and Individual Differences*, 125, 30–37.
- Greenaway, K. H., Louis, W. R., & Hornsey, M. J. (2013). Loss of control increases belief in precognition and belief in precognition increases control. *PloS One*, 8, e71327.
- Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The meaning maintenance model: On the coherence of social motivations. *Personality and Social Psychology Review*, 10(2), 88–110.
- Jolley, D., & Douglas, K. M. (2017). Prevention is better than cure: Addressing anti-vaccine conspiracy theories. *Journal of Applied Social Psychology*, 47(8), 459–469.
- Kakkar, H., & Sivanathan, N. (2017). When the appeal of a dominant leader is greater than a prestige leader. *Proceedings of the National Academy of Sciences*, 114(26), 6734–6739.
- Kay, A. C., & Eibach, R. P. (2013). Compensatory control and its implications for ideological extremism. *Journal of Social Issues*, 69, 564–585.
- Kay, A. C., Gaucher, D., Napier, J. L., Callan, M. J., & Laurin, K. (2008). God and the government: testing a compensatory control mechanism for the support of external systems. *Journal of Personality and Social Psychology*, 95(1), 18–35.

- Kay, A. C., Moscovitch, D. A., & Laurin, K. (2010a). Randomness, attributions of arousal, and belief in God. *Psychological Science*, 21(2), 216–218.
- Kay, A. C., Shepherd, S., Blatz, C. W., Chua, S. N., & Galinsky, A. D. (2010b). For God (or) country: The hydraulic relation between government instability and belief in religious sources of control. *Journal of Personality and Social Psychology*, 99(5), 725–739.
- Kay, A. C., Whitson, J. A., Gaucher, D., & Galinsky, A. D. (2009). Compensatory control: Achieving order through the mind, our institutions, and the heavens. *Current Directions in Psychological Science*, 18(5), 264–268.
- King, C., & Leask, J. (2017). The impact of a vaccine scare on parental views, trust and information needs: A qualitative study in Sydney, Australia. *BMC Public Health*, 17(1), 1–10.
- Kyrios, M., Mogan, C., Moulding, R., Frost, R. O., Yap, K., & Fassnacht, D. B. (2017). The cognitive-behavioural model of hoarding disorder: Evidence from clinical and non-clinical cohorts. *Clinical Psychology & Psychotherapy*, 25(2), 311–321.
- Lachman, M. E., & Weaver, S. L. (1998). The sense of control as a moderator of social class differences in health and well-being. *Journal of Personality and Social Psychology*, 74(3), 763–773.
- Landau, M. J., Kay, A. C., & Whitson, J. A. (2015). Compensatory control and the appeal of a structured world. *Psychological Bulletin*, 141(3), 694–722.
- Lembregts, C., & Pandelaere, M. (2019). Falling back on numbers: When preference for numerical product information increases after a personal control threat. *Journal of Marketing Research*, 56(1), 104–122.
- Lewandowsky, S., Ecker, U. K. H., Seifert, C. M., Schwarz, N., & Cook, J. (2012). Misinformation and its correction continued influence and successful debiasing. *Psychological Science in the Public Interest*, 13(3), 106–131.
- Lewandowsky, S., Oberauer, K., & Gignac, G. E. (2013). NASA faked the moon landing—therefore, (climate) science is a hoax: An anatomy of the motivated rejection of science. *Psychological Science*, 24(5), 622–633.
- Li, H., Song, Y., & Xie, X. (2020). Altruistic or selfish? Responses when safety is threatened depend on childhood socioeconomic status. *European Journal of Social Psychology*, 50(5), 1001–1016.
- Ma, A., & Kay, A. C. (2017). Compensatory control and ambiguity intolerance. *Organizational Behavior and Human Decision Processes*, 140, 46–61.
- Mao, J. -Y., Yang, S. -L., & Guo, Y. -Y. (2020). Are individuals from lower social class more susceptible to conspiracy theories? An explanation from the compensatory control theory. *Asian Journal of Social Psychology*, 23, 372–383.

- Martin, L. L., & van den Bos, K. (2014). Beyond terror: Towards a paradigm shift in the study of threat and culture. *European Review of Social Psychology*, 25(1), 32-70.
- Meegan, D. V. (2010). Zero-sum bias: Perceived competition despite unlimited resources. *Frontiers in Psychology*, 1, 191.
- Noordewier, M. K., & Rutjens, B. T. (2021). Personal need for structure shapes the perceived impact of reduced personal control. *Personality and Individual Differences*, online publication. <https://doi.org/10.1016/j.paid.2020.110478>
- Norris, P., & Epstein, S. (2011). An experiential thinking style: Its facets and relations with objective and subjective criterion measures. *Journal of Personality*, 79, 1043-1079.
- Oglesby, M. E., Medley, A. N., Norr, A. M., Capron, D. W., Korte, K. J., & Schmidt, N. B. (2013). Intolerance of uncertainty as a vulnerability factor for hoarding behaviors. *Journal of Affective Disorders*, 145(2), 227-231.
- Pezzo, M. V., & Beckstead, J. W. (2006). A multilevel analysis of rumor transmission: Effects of anxiety and belief in two field experiments. *Basic and Applied Social Psychology*, 28(1), 91-100.
- Proulx, T., Inzlicht, M., & Harmon-Jones, E. (2012). Understanding all inconsistency compensation as a palliative response to violated expectations. *Trends in Cognitive Sciences*, 16(5), 285-291.
- Rao, T.-T., Yang, S.-L., & Zhu, X. (2022). How Does Social Class Affect Need for Structure during the COVID-19 Pandemic? A Moderated Mediating Model Analysis. *International Journal of Environmental Research & Public Health*, 19, 932.
- Rothschild, Z. K., Landau, M. J., Sullivan, D., & Keefer, L. A. (2012). A dual-motive model of scapegoating: Displacing blame to reduce guilt or increase control. *Journal of Personality and Social Psychology*, 102, 1148-1163.
- Rutjens, B. T., Van Harreveld, F., Joop, V. D. P., Kreemers, L. M., & Noordewier, M. K. (2013). Steps, stages, and structure: Finding compensatory order in scientific theories. *Journal of Experimental Psychology: General*, 142(2), 313-318.
- Shepherd, S., Kay, A. C., Landau, M. J., & Keefer, L. A. (2011). Evidence for the specificity of control motivations in worldview defense: Distinguishing compensatory control from uncertainty management and terror management processes. *Journal of Experimental Social Psychology*, 47, 949-958.
- Stanley, M. L., Marsh, E. J., & Kay, A. C. (2020). Structure-seeking as a psychological antecedent of beliefs about morality. *Journal of Experimental Psychology: General*, online publication. <http://dx.doi.org/10.1037/xge0000752>
- Sullivan, D., Landau, M. J., Rothschild, Z. K. (2010). An existential function of enmityship: Evidence that people attribute influence to personal and political

enemies to compensate for threats to control. *Journal of Personality and Social Psychology*, 98(3), 434-449.

Tolin, D. F. (2011). Understanding and treating hoarding: A biopsychosocial perspective. *Journal of Clinical Psychology: In Session*, 67(5), 517-526.

Van Bavel, J. J., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., ... & Willer, R. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour*, 4(5), 460-471.

Van den Bos, K., Van Ameijde, J., & Van Gorp, H. (2006). On the Psychology of Religion: The Role of Personal Uncertainty in Religious Worldview Defense. *Basic and Applied Social Psychology*, 28, 333-341.

van Prooijen, J. W. (2020). An existential threat model of conspiracy theories. *European Psychologist*, 25(1), 16-25.

van Prooijen, J. W., & Acker, M. (2015). The influence of control on belief in conspiracy theories: Conceptual and applied extensions. *Applied Cognitive Psychology*, 29(5), 753-761.

van Prooijen, J. W., & Douglas, K. M. (2018). Belief in conspiracy theories: Basic principles of an emerging research domain. *European Journal of Social Psychology*, 48(7), 897-908.

van Prooijen, J. W., Krouwel, A. P., & Pollet, T. V. (2015). Political extremism predicts belief in conspiracy theories. *Social Psychological and Personality Science*, 6(5), 570-578.

Wei, Z. -H., Tao, R., Liu, H., & Li, S. (2017). 'Freedom from fear and want' and our psychological response to environmental changes. *Journal of Pacific Rim Psychology*, 11, e10.

Whitson, J. A., & Galinsky, A. D. (2008). Lacking control increases illusory pattern perception. *Science*, 322, 115-117.

Whitson, J. A., Kim, J., Wang, C. S., Menon, T., & Webster, B. D. (2019). Regulatory focus and conspiratorial perceptions: The importance of personal control. *Personality and Social Psychology Bulletin*, 45(1), 3-15.

Wu, L., & Liu, J. (2020). Need for control may motivate consumers to approach digital products: A social media advertising study. *Electronic Commerce Research*, online publication. <https://doi.org/10.1007/s10660-020-09399-z>

Xu, X., & McGregor, I. (2018). Motivation, threat, and defense: Perspective from experimental social psychology. *Psychological Inquiry*, 29(1), 32-37.

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