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Analysis of Group Behavior and Regulation Strategies under Emergencies

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Abstract—*Emergencies not only cause socio-economic losses but also trigger irrational group behavior among the public. The regulation of group behavior under emergencies is crucial for maintaining social stability. This paper analyzes the evolutionary patterns of group behavior under emergencies. Firstly, it examines the evolutionary stages from formation to dissipation and their characteristics. Then, it elaborates on the influencing factors of group behavior evolution. Based on this analysis, the paper proposes regulation strategies for group behavior under emergencies. These regulation strategies can practically guide emergency response work and provide reference and insights for future research on related issues.*

Keywords— ***Emergency, Group Behavior, Evolution, Regulation Strategies***

I. INTRODUCTION

the introduction of the paper should explain the nature of the problem, previous work, purpose, and the contribution of the paper. The contents of each section may be provided to understand easily about the paper. An emergency refers to a sudden incident—such as a natural disaster, accident, public health event, or social safety incident—that causes or may cause severe social harm and requires emergency measures for response. In recent years, with rapid social development and increasing population density, the frequency of various emergencies, such as natural and man-made disasters, has been rising, and their complexity and severity have also increased. The severity of emergencies triggers significant social reactions, which include group behavior under emergencies, particularly irrational group behavior. From the practice of emergency response, whether facing COVID-19, avian flu events, or other natural disasters and man-made accidents, groups exhibit varying degrees of irrational behavior. These irrational behaviors are mostly caused by human factors and are related to the group's anticipated psychological state. Because emergencies erupt suddenly and are accompanied by severe circumstances, people within the group often lose psychological balance, experience psychological pressure, and even panic. Group behavior under emergencies exhibits distinct irrational characteristics. Once group behavior occurs under an emergency, it may trigger a chain reaction, and these secondary events could lead to more severe social impacts. Group behavior under emergencies may not always manifest overtly; it may also remain hidden within various aspects of society, intensifying as the situation develops. Therefore, government departments and organizations at all levels need to acknowledge its existence. The characteristics of group behavior under emergencies are the primary basis for constructing emergency crisis response mechanisms and strategies. Conducting in-depth research on this topic holds significant theoretical and practical importance.In recent years, scholars have studied group behavior under emergencies, primarily focusing on the characteristics of group panic and escape behavior. For instance, David (2000) and Helbing (2000) assumed that groups under emergencies consist of distinct individuals with capabilities and thoughts, and then studied the irrational characteristics of group panic and escape behavior. Other scholars have conducted research from a social psychology perspective, such as studies on non-adaptive group behavior (Mintz, 1951), group behavior in

panic environments (Kelley, 1965), and behavioral choices in panic states (Quarantelli, 1957). Building upon existing research, this paper conducts a more in-depth study, aiming to expand the theory related to group behavior under emergencies while further clarifying the evolutionary patterns and mechanisms of group behavior, thereby providing new ideas and methodological references for regulating group behavior under emergencies.

II. ANALYSIS OF THE EVOLUTIONARY PATTERNS OF GROUP BEHAVIOR UNDER EMERGENCIES

The evolution of group behavior under emergencies is influenced by various factors during the incident and follows certain patterns. Fink (1986), drawing an analogy to the disease development process, proposed a crisis stage model, dividing the development of crisis events into: prodromal crisis stage, acute crisis stage, chronic crisis stage, and crisis resolution stage. Based on the temporal sequence of emergency development and evolution, this paper divides the evolution of group behavior under emergencies into four stages: formation stage, spreading stage, outbreak stage, and dissipation stage.

The initial phase is the formation phase. At the onset of an emergency, as ordinary people worry that their lives and interests may be threatened, they develop a sense of concern. When many individuals come together for a shared specific concern, a group forms. At this stage, group members' emotions are relatively stable, and individuals within the group begin to openly exchange information to learn more. During this stage, the group exhibits high uncertainty regarding structure, purpose, and leadership. Potential factors that may induce group behavior accumulate during this phase. If these factors are not given sufficient attention or effectively resolved, their accumulation may gradually lead to an eruption, causing the further development of group behavior.

Subsequently comes the spreading stage. The most noticeable change in this stage is the expansion of group size and the further development of group relationships. Coupled with mutual reinforcement among group members, members develop a strong sense of group identity and like-mindedness, and small-scale leaders emerge. Group members influence each other and engage in extensive information exchange. Due to information asymmetry, rumors easily arise during this stage, and some individuals spread rumor information through various channels. Access to large amounts of uncertain information causes worry among group members, an emotion highly contagious to other members. For example, during the 2011 Japanese earthquake and nuclear leakage crisis, people credulously believed the rumor that "eating iodized salt can prevent radiation," leading to frenzied salt-buying behavior in many parts of China. During the spreading stage, besides the continuous stimulation of external environmental factors, the internal group environment also plays a driving role. Discussions, emotions, behaviors, and even the atmosphere within the group become strong suggestions and stimuli, rapidly assimilating the psychology and behavior of others into the group. That is, under group pressure, individuals often develop conformity psychology and engage in herd behavior.

If government departments fail to monitor the psychological and emotional reactions of group members in the previous two stages or do not take timely emergency measures, group member behavior evolves into the outbreak stage. At this point, the group's structure exerts its maximum effect and gains widespread recognition. The group's behavior progresses from worry and mutual influence to taking unified action. Some individuals within the group incite members to take action, even provoking violent behavior in others. Other members often exhibit herd mentality, imitating the behavior of other individuals within the group. Large-scale collective actions severely disrupt social order and cause adverse social impacts. At this stage, individual intrinsic needs are no longer the primary driving force. Individuals' blind, irrational behavior is no longer solely to satisfy their own safety or interest needs but may derive other needs.

Group behavior emerges due to certain reasons, prompting government departments to pay high attention and rapidly implement emergency response measures. This leads to a rapid alleviation of group behavior, stabilization of group members' emotions, abandonment of various irrational activities, and a significant reduction in group size (Wei Jiuchang et al., 2011). At this stage, individuals' psychology receives some comfort due to reliable assurances. Rumor information no longer exerts a driving force; its importance and ambiguity tend towards zero. Group members begin to negate their previous value judgments based on psychological expectations, and group behavior enters a state of dissipation.

Beyond adhering to the four-stage evolutionary pattern described above, group behavior under emergencies exhibits distinctive characteristics, manifested in the following four evolutionary features.

Individuals in a group instinctively imitate the behavior of the majority. When people face emergencies, many lose rationality. At this point, people instinctively imitate each other, striving to align their behavior with the

majority present, thereby leading to group behavior. In this process, individuals within the group may transfer their sense of control to others, following their opinions. This transfer of control can be understood as occurring when individuals perceive the cost of maintaining autonomy to exceed the benefits, leading them to transfer control to maximize benefits and pursue a sense of security. This individual imitation of the majority gradually forms group behavior. Additionally, the pressure experienced under emergencies may cause some individuals, consciously or unconsciously, to trigger actions that provoke other behaviors. Other individuals in the group, having lost their capacity for self-direction, are prone to follow the directives of these individuals, potentially further exacerbating the group's irrational behavior.

Emotional contagion occurs within the group and may gradually spread. Group behavior is the result of emotional contagion. Participants in group behavior partially lose their conscious personality, and the unconscious personality dominates. A certain emotion gradually infects and spreads within the group, and under the influence of psychological suggestion, people's psychology develops in a specific direction, gradually transforming suggested ideas into group action.

Group behavior may generate emergent norms in urgent situations. Facing emergencies, people generate some norms through interaction. Formal norms may not be established in advance for group behavior, but during emergencies, people generate emergent temporary norms through interaction. These emergent norms typically manifest as a behavior pattern that appears first in the group behavior and is rapidly imitated by others. Once an emergent norm arises, it creates normative pressure on those present, forcing them to imitate and comply, thus forming group behavior.

The behavior of some group members may exhibit anonymity. The emergence of some destructive group behaviors is due to participants being in an anonymous position, leading to a diffusion of responsibility. Anonymity refers to the state of confusion caused by the emergency, reducing adherence to social norms, thereby enabling individuals to perform actions rarely or never done before in the context of group behavior (Sun Duoyong, 2005). Some group members may even believe that the chaos during an emergency allows their illegal actions to be hidden and go unpunished. They might seize the opportunity to commit crimes, such as the looting and violent assaults that occurred during Hurricane Katrina in New Orleans, USA. This anonymity leads to opportunistic behavior characteristics in some group members.

III. ANALYSIS OF FACTORS INFLUENCING THE EVOLUTION OF GROUP BEHAVIOR UNDER EMERGENCIES

In 1950, Homans published "The Human Group," which elaborates a general theory about groups and group behavior. He pointed out that three elements simultaneously influence groups: activity, interaction, and sentiment. Drawing on Homans' three influencing factors, we consider that during the evolution of group behavior under emergencies through the four stages—formation, intensification (spreading), outbreak, and dissipation—it is influenced by external environmental conditions, internal group structure, group members' capabilities, group size, and other factors. Specifically, the influencing factors include the following.

3.1 Threats to the interests of group members are a significant cause of group behavior

Whether these interest demands of group members are met also affects the further evolution of group behavior. Threats to the interests of group members may, on a large scale, affect their survival or, on a smaller scale, cause them economic losses, leading to anxiety. This anxiety can trigger group behavior. For group members, survival and personal development are paramount, and issues related to these aspects attract intense concern. Although group behavior under emergencies occurs suddenly, evolves rapidly, and is highly ambiguous, the root of many behaviors stems from threats to group members' interests. When group members feel their interests are threatened, driven by nature and instinct, they produce stress responses, thereby triggering group behavior.

3.2 Interaction among the group through various channels under emergencies plays a crucial role in the evolution of group behavior

During the evolution of group behavior, various interactions within the group draw more individuals into the behavior. On the one hand, the language, behavior, and demeanor of certain individuals within the group exert strong suggestions and emotional contagion on others, spreading continuously. Under the influence of herd mentality, other individuals involuntarily imitate their behavior, gradually developing a tendency towards group behavior themselves. On the other hand, individuals within the group influence individuals outside the group through various channels of interaction, drawing them into the group and gradually expanding its influence. Among the various channels used for group interaction, the internet channel, due to its excellent interactivity, has become increasingly important. The low-cost, timely interaction facilitated by the internet makes information exchange

between individuals in society easier, which also significantly promotes the evolution of group behavior.

3.3 Internal group relationships are an important factor influencing the intensity of group behavior evolution

Internal group relationships significantly impact the evolution of group behavior. Internal relationships are divided into strong ties and weak ties. Strong ties indicate high group homogeneity, where relationships are closer due to stronger emotional bonds between people. Weak ties indicate high group heterogeneity, meaning interaction partners come from diverse sources, with less emotional connection and looser relationships. Simultaneously, group cohesion plays a vital role in group behavior evolution. Group members engage in emotional exchange and build dependencies through interaction and communication. When an emergency threatens group interests, group cohesion is activated, forming group behavior. Group homogeneity is crucial for enhancing cohesion, thereby influencing the intensity of group behavior evolution. Homogeneous groups have members with relatively similar values and behavioral norms, leading to stronger cohesion. In an emergency state, they are prone to mutual imitation and learning, and members' emotions are easily aroused by each other, making it easier to engage in relatively extreme irrational behavior (Zhou Lei, 2014).

3.4 The characteristics of the emergency itself also affect the intensity of group behavior evolution

Emergencies are categorized into many types, such as natural disasters, accident disasters, public health events, and social safety events. If the emergency is a public health event or social safety event, and the government or responsible parties' handling methods or proposed compensation fail to satisfy the public, relevant interest groups may resort to extreme actions to express their demands and dissatisfaction. Wang Cijiang (2010) argues that in emergencies, whether fatalities occur, the number of deaths, and the cause of death are strongly correlated with the conflict level of group behavior. Using "deaths" to express protest is a common tactic; death is often linked to protest, such as using corpses for protest, refusing burial, or carrying corpses in marches, which are part of group behavior. Furthermore, using "deaths" to incite public sentiment and win sympathy from bystanders and public opinion is a significant factor intensifying the evolution of group behavior. In mass emergencies, some group behaviors may start relatively mildly but gradually evolve into intense violent conflicts after prolonged accumulation. The longer government departments take to handle the situation, the longer the mass emergency persists, forcing the situation of group behavior to worsen and its social impact to expand.

IV. RESPONSE STRATEGIES FOR REGULATING GROUP BEHAVIOR UNDER EMERGENCIES

Group behavior under emergencies is related to the social context; its emergence and development are inseparable from the prevailing social environment. Specific external environments foster the outbreak and evolution of group behavior. A scientific and reasonable response to group behavior under emergencies should start from the contextual environment of the emergency, considering laws and regulations, government measures, and other aspects to formulate response strategies for regulating group behavior under emergencies.

4.1 Assess potential factors that may induce irrational group behavior and actively address the focal conflicts of public concern

After an emergency occurs, when formulating response measures, the government should not only consider economic benefit assessments but also conduct social stability risk assessments. When facing emergencies in public interest areas with significant group involvement, such as education, healthcare, environmental sanitation, and food/drug safety, special caution is needed. Extensive research should be conducted, encouraging relevant groups to send representatives to participate in expressing opinions. Scientific coordination and consultation should ensure democratic participation in the emergency response policy-making process, aligning policy objectives with the interests of the vast majority of group members, thereby reducing group incidents triggered by inappropriate policies. When conflicts of interest between different groups arise during an emergency, the government, while participating in resolving these conflicts, must also conduct a situation assessment of the potential evolution of group behavior. If government policies involve the vital interests of large groups, prevention and response mechanisms for group incidents should be activated in advance. Furthermore, establishing a fast, routine, and low-cost legal mechanism for expressing group interest demands is key to preventing and resolving the outbreak of negative group behavior under emergencies.

4.2 The government must communicate timely with the public, release positive information, and prevent public misunderstanding caused by information gaps leading to negative impacts

As we are in the internet era, the rapid development of information technology makes information exchange between individuals simple and easy after an emergency. If the government attempts to prevent unnecessary public worry and anxiety through information control, this approach can backfire. This is because a large amount of diverse information can reach the public in a short time,

potentially overloading the crisis information communication system. The public also struggles to identify useful information from the deluge. If the public cannot obtain needed information timely through official government channels, they will turn to other channels, even if these channels disseminate rumors. Public demand for information follows certain patterns; group members naturally tend to focus on information related to their own interests. This demand is very high at the onset of an emergency. The shared focus of multiple individuals within the group gradually evolves into a psychological and behavioral defense mechanism of the group, slowly forming group behavior. If the government can timely publish emergency response strategies and relevant policies, releasing more positive information, it can satisfy the public's information needs in this anxious state and generate a positive impact. Conversely, if information gaps lead most group members to accept and believe erroneous information, negative impacts may arise. It is important to note that group behavior is unorganized; its information comes not from organizational channels but from non-organizational channels, namely rumors and gossip. Rumors and gossip are unverified information about people or events spread among the public. They can occur at any time, but generally, they proliferate during social upheavals. It is the spread of rumors and gossip that guides the formation of shared perceptions and common emotions, leading to group behavior. For example, during the 2003 SARS outbreak, many individuals credulously believed rumors, acted without thinking, blindly followed trends, and rushed to buy white vinegar, Banlangen (Isatis root), and other antiviral drugs, triggering significant buying frenzies.

4.3 The government should actively utilize new media to communicate emergency information with the group and guide group behavior

Internet-based group behavior tendencies are a new trend of the current era. The government needs to actively use new media, especially online media, to communicate emergency information with the group and guide group behavior. Group behavior arising after emergencies exhibits new characteristics due to the emergence of current network new media. Mass media carry the function of information dissemination. Today, with the rapid development and increasing penetration of the internet, online media bear increasingly significant responsibilities. Coupled with their unique features of faster information dissemination and better interactivity, they provide a more convenient and crucial platform than traditional media for transmitting information after public emergencies. Precisely because of the rapid development of internet technology, internet-based group behavior tendencies have emerged. Internet-based group behavior manifests as, after an emergency occurs, the attention of large numbers of individuals focuses on this specific event. Although these individuals' actions were previously unconnected, because they communicate and interact around this specific event, they eventually form a temporary group. Within this group, members' behavior serves as reference points and influences each other. Such groups can sometimes become dominant voices in online public opinion. Therefore, when conducting work, the government should value the influence of online public opinion and be adept at using online media for publicity efforts.

4.4 Monitor the emotional reactions of groups affected by the emergency in real-time, establish a "pressure valve" mechanism, and promptly intervene in and channel out-of-control emotions within the group

According to physics, when the pressure inside a pressurized object reaches the critical point its shell can withstand, danger signals and signs appear. Hence, a pressure cooker has a pressure valve. This valve serves two purposes: it sounds an alarm when pressure is too high and releases steam to reduce pressure when excessive. We also need to establish such a "pressure valve" mechanism to detect problems in time while monitoring group emotional reactions and simultaneously channel out-of-control emotions within the group promptly. After an emergency occurs, the shock it brings easily triggers intense emotional reactions in affected group members. If not discovered and channeled in time, this may slowly accumulate as negative energy; once it erupts, it can produce adverse effects. A mechanism and method must be established to allow the psychological energy of the group to be continuously released, maintaining stability. Therefore, accurately assessing the potential psychological and behavioral impact of the emergency on those involved and timely channeling the group's out-of-control emotions are key factors in effectively preventing mass incidents. If many individuals within a group exhibit out-of-control emotions, emotional contagion often occurs, spreads, and transmits to other social individuals through various social network relationships, triggering collective group actions. Moreover, in the process of China's social modernization, due to difficulties in interest distribution, an imperfect social security mechanism, and incomplete political systems, contradictions exist within diverse interest groups. Various competitions and conflicts are inevitable; the whole society is undercurrent, gathering multiple risk factors. Individual, accidental, localized emergencies might trigger relatively intense emotional reactions in related groups. By establishing a psychological early warning system based on emergencies to monitor the psychological and emotional reactions of groups and

communities under emergencies, the government can, on the one hand, improve the scientific basis of emergency management decision-making, minimizing losses and avoiding their expansion or delay due to decision-making errors. On the other hand, through interventions targeting key factors influencing public psychological and behavioral reactions, such as scientific public opinion guidance or psychological education, it can reduce the group's irrational behavior and prevent the event from escalating further.

4.5 Promptly detect and control the intense behavioral loss of control by certain individuals within the group, maintaining mutual influence among individuals in a self-controlled state

Under emergency conditions, as group behavior may become intense, some individuals may act completely differently than usual, even committing crimes. This state, when triggered, may have intentional or unintentional causes. Intentional causes may stem from the anonymity in group behavior; some individuals believe that the chaotic state during an emergency allows their actions to go unpunished, so they might seize the opportunity to commit crimes, such as the looting and other out-of-control behaviors seen during Hurricane Katrina in New Orleans, USA. Unintentional causes may be the immense pressure from the emergency causing some individuals to lose behavioral control, subsequently influencing and infecting other group members to vent their emotions through similar behavior. Whether intentional or unintentional, loss of behavioral control must be detected and handled promptly; otherwise, others will be influenced, leading to greater turmoil. Because the pressure endured under emergencies may cause some individuals, intentionally or unintentionally, to incite violent actions in themselves, and other individuals in the group, having lost their capacity for self-direction, are prone to follow the directives of these individuals. Furthermore, violent behavior will further exacerbate the group's irrational behavior. Therefore, individuals within a group incident who incite or instigate others to commit violent acts should be swiftly controlled, removed, and isolated from the group. Maintaining the mutual influence among individuals within a group incident at a reduced or moderate level will significantly decrease the harmfulness of group behavior, thereby achieving effective control of mass incidents.

V. CONCLUSION

Emergencies are highly uncertain. Once they erupt, they not only cause socio-economic losses but also instill panic in the public. Therefore, group behavior under emergencies exhibits irrational characteristics. The initiation of such group behavior cannot be judged by conventional rules, and its development and impact lack ready-made experiential knowledge for guidance. This paper proposed evolutionary stages from emergence to dissipation, analyzed factors influencing the evolution of group behavior, and finally proposed group behavior regulation strategies. It is important to note that group behavior under emergencies may trigger chain reactions during its evolution, potentially causing more severe secondary events, so it must be taken seriously. When regulating group behavior during emergencies, preventing and resolving the group's irrational behavior should be treated as a battle, requiring strategic, sustainable institutional arrangements and policy choices.

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