

Influencing Factors and Mechanisms of Health Motivated Reasoning

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Abstract

Health-motivated reasoning refers to the psychological process whereby individuals selectively process health information to reinforce or maintain their own health beliefs and behaviors. Current research primarily addresses classification patterns of health motivation, influencing factors of health-motivated reasoning, and its underlying mechanisms. Health motivation can be categorized based on characteristics such as temporal orientation, individual psychology, reasoning goals, regulatory strategies, and information lifecycle. This form of reasoning is closely associated with three categories of factors: first, personal factors including health beliefs, cognitive traits, and discrete emotions; second, information characteristics such as information conflict and information framing; third, sociocultural factors such as social identity and cultural norms. Employing Bayesian models to dynamically analyze how motivation influences the processing of health information facilitates the integration of new health evidence and the adjustment of individual beliefs. Future research should endeavor to construct comprehensive models of influencing factors for health-motivated reasoning, explore its mechanisms in depth through integration with cognitive neuroscience methods, and further optimize health intervention strategies.

Full Text

Preamble

Factors and Mechanisms Underlying Health-Related Motivated Reasoning

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Abstract

Health-related motivated reasoning refers to the psychological process by which individuals selectively process health information to maintain or reinforce their existing health beliefs and behaviors. Current research primarily addresses the classification of health motivation, the influencing factors of health-related motivated reasoning, and its underlying mechanisms. Health motivation can be categorized based on dimensions such as time orientation, psychological traits, reasoning goals, regulatory strategies, and stages of the information life cycle. This reasoning process is shaped by three major types of factors: personal factors (e.g., health beliefs, cognitive traits, discrete emotions), informational characteristics (e.g., information conflict, framing effects), and socio-cultural factors (e.g., social identity, cultural norms). Employing Bayesian models to dynamically examine how motivation modulates health information processing can provide insights into the integration of new evidence and the adjustment of individual beliefs. Future research should aim to construct a comprehensive model of influencing factors, incorporate cognitive neuroscience methods to elucidate underlying mechanisms, and further refine strategies for health interventions.

Keywords: motivated reasoning, motivation type, health beliefs, information framework, Bayesian inference

1 Introduction

Motivated reasoning is an affectively invested, biased psychological process that defends existing positions or prior beliefs (孔达, 2013, p.157; 诺韦拉等, 2020, p.77). International psychological research on motivated reasoning has predominantly focused on highly politicized and adversarial concepts and behaviors such as partisan conflicts and social disputes (Filindra & Harbridge-Yong, 2022; Hutmacher et al., 2024; Mehlhaff et al., 2024), with relatively less attention given to more everyday topics. This paper focuses specifically on motivated reasoning about health issues among the general public (hereinafter referred to as health-related motivated reasoning), defined as the psychological process by which individuals selectively process health information to strengthen or maintain their health beliefs and behaviors (Savolainen, 2022; Sylvester, 2021). This represents a specific type of motivated reasoning that, while potentially generating inter-group disagreements in particular contexts (e.g., public health events) (Graham & Singh, 2024; Moon et al., 2023), generally concerns universal issues in daily life, occurring more frequently and involving broader populations, albeit with typically lower conflict intensity. It should be noted that when health information touches upon core individual interests or poses clear threats, health-related motivated reasoning often becomes more risk-oriented and emotionally driven (Peng, 2022; Simonovic et al., 2023).

Health-related motivated reasoning can lead to biased information processing but also serves adaptive functions. On one hand, research has shown that it may cause individuals to resist health recommendations and selectively accept

scientific evidence, thereby affecting critical health behaviors such as vaccination, disease prevention, and medical compliance (Appel & Sanatkar, 2024; Courbage & Peter, 2021). On the other hand, it may also play a positive role in certain contexts (Green et al., 2020), such as helping individuals maintain positive health beliefs that facilitate goal achievement, like adhering to exercise routines. Although existing research has identified these dual effects, no systematic review has yet synthesized this topic, and discussions of its theoretical foundations, influencing factors, mechanisms, and applied value remain limited.

Therefore, comprehensively reviewing and examining the core content of health-related motivated reasoning will not only enhance understanding of how individuals form and maintain health beliefs but also provide crucial theoretical support for optimizing health communication strategies and improving intervention effectiveness. This is particularly significant for addressing increasingly complex health communication environments and enhancing public health literacy.

Accordingly, this paper focuses on motivated reasoning in the health domain, exploring the reasoning tendencies that emerge during health information processing. Specifically, it first defines health-related motivated reasoning, highlights its distinctive features, and reviews classification models of health motivation. It then summarizes influencing factors based on previous research, primarily involving three categories: personal factors, informational factors, and cultural factors. Next, it analyzes the underlying mechanisms from both traditional and Bayesian model perspectives, revealing how health-related motivated reasoning affects information processing and belief updating. Finally, it proposes future research directions by considering applications in key health domains.

2.1 Connotation of Health-Related Motivated Reasoning

Health-related motivated reasoning is essentially a cognitive processing process and a specific manifestation of the broader concept of “motivated reasoning” in the health domain. It refers to the systematic bias that occurs when individuals, driven by health goals or emotions, tend to accept or interpret information consistent with their health motivations while ignoring or refuting contradictory information during information selection, interpretation, and memory processes (Dickinson & Kakoschke, 2021; Meppelink et al., 2019). Similar to motivated reasoning in general (Braman & Nelson, 2007; Epley & Gilovich, 2016; Taber & Lodge, 2006), these reasoning processes are not entirely rational and often aim not at seeking objective facts but at serving specific motivational needs, such as maintaining beliefs, adjusting cognition, or rationalizing one’s own behaviors.

However, health-related motivated reasoning differs from general motivated reasoning in that it typically exhibits stronger risk orientation and emotional drive. Risk orientation means that health-related motivated reasoning often accompanies high-risk behavioral consequences that may directly affect individual quality of life and public health levels, making individuals more likely to exhibit “approach-avoidance” motivational biases when processing information (Kalke

et al., 2021; Simonovic et al., 2023). For example, patients receiving weight loss advice may perceive negative evaluations about their weight but, being more concerned about the potential health benefits of improving dietary habits, tend to accept corresponding health recommendations (Standen et al., 2025). This phenomenon demonstrates the special sensitivity of health-related motivated reasoning to risk information. Emotional drive emphasizes that because health and death are core concerns, the emotional drivers of health-related motivated reasoning (such as fear and anxiety) are often more direct and intense (Peng, 2022; Zhang & Zhou, 2019). When facing major disease diagnoses, individuals may over-deny or ignore disease risks due to fear, even using optimistic self-comfort to alleviate actual anxiety experiences.

2.2 Classification Models of Health Motivation

As the fundamental driving force behind health-related motivated reasoning, health motivation determines how individuals cognitively and behaviorally respond to health information. Given the diverse types of health motivation and their potential to individually or interactively influence information processing and behavioral responses to specific health topics, accurately classifying health motivation becomes an important prerequisite for understanding individual health information processing logic. Throughout the development of motivation classification, different theoretical backgrounds and research objectives have jointly enriched and advanced motivation research. Although many existing motivation classification theories were not originally proposed for health behavior, their widespread application in health research has provided important support for understanding individual information processing patterns. The following sections introduce five common classification models in chronological order of their representative publications, with specific applications in health contexts (Table 1).

Table 1 Classification of Motivation

Representative Research	Motivation Types	Core Distinction	Theoretical Origin
Schutz, 1962	Retrospective motivation, Prospective motivation	Past/experience vs. Future/expectation	Time orientation
Deci & Ryan, 1985	Intrinsic motivation, Extrinsic motivation, Amotivation	Self-determination theory	Motivation continuum

Representative Research	Motivation Types	Core Distinction	Theoretical Origin
Kunda, 1990	Accuracy motivation, Directional motivation	Cognitive dissonance theory	Accuracy vs. purpose
Higgins, 1997	Promotion focus, Prevention focus	Regulatory focus theory	Positive vs. negative outcomes
Wilson & Maceviciute, 2022	Generation, promotion, and dissemination motivation	Information life cycle theory	Three stages of information life cycle

Source: Compiled by the authors

Early research classified motivation based on temporal orientation, distinguishing between retrospective motivation (“because motives”) and prospective motivation (“in order to motives”; Schutz, 1962). This work noted that retrospective motivation stems from individuals’ psychological states and personal experiences, primarily pointing to past conditions and circumstances, such as when an individual “tries to quit smoking because long-term smoking has caused coughing.” In contrast, prospective motivation relates to future expectations, such as when an individual “develops a fitness plan to reduce future cancer risk.” In health-related motivated reasoning, retrospective motivation leads individuals to process information based on past health experiences, tending to retain interpretation patterns consistent with existing cognition, whereas prospective motivation guides individuals toward future health expectations, making them more receptive to information aligned with their expectations and thus exhibiting selective preferences. This distinction reveals how motivation shapes reasoning pathways along the temporal dimension, helping to understand how individuals mobilize experience and expectations in health contexts.

As research progressed, self-determination theory proposed that it is the type, rather than the amount, of motivation that determines behavioral differences (Ryan & Deci, 2017). This theory commonly classifies motivation along a continuum, distinguishing intrinsic motivation, extrinsic motivation, and amotivation (Deci & Ryan, 1985). Intrinsic motivation refers to spontaneous behavior driven by interest or satisfaction, extrinsic motivation involves action for external rewards or pressures, and amotivation reflects a state lacking clear behavioral intention (Ryan & Deci, 2020). Different motivation types shape how individuals process health and exercise information (Converse et al., 2019). Individuals with higher intrinsic motivation, due to stronger autonomy, tend to prioritize information that supports self-worth and internal satisfaction, exhibiting selec-

tive processing tendencies and being more likely to persist in exercise (Camp et al., 2024). Those dominated by extrinsic motivation, driven by social evaluation, prefer information that enhances social image and are prone to social identity-based reasoning biases, such as engaging in compulsive exercise behaviors to obtain rewards or avoid punishment (Staples et al., 2022). Amotivated individuals, lacking clear motivation, show low information processing investment and typically lack exercise intention (Ednie & Stibor, 2017). The development of self-determination theory shifted motivation research from time orientation to internal needs and provided a theoretical basis for understanding diverse biases in health-related motivated reasoning.

Cognitive dissonance theory refines motivation classification from an information processing perspective. This theory suggests that individuals tend to process information in biased ways to maintain internal cognitive consistency (Festinger, 1957). Kunda (1990) subsequently developed a framework to understand motivation classification under this theory, proposing accuracy motivation—where individuals aim to form as correct and objective conclusions as possible—and directional motivation, which drives behavior toward specific goals or objects. Accuracy motivation prompts individuals to process information in a verification-oriented manner, aiming to reduce judgment bias and enhance reasoning objectivity, whereas directional motivation drives individuals to prioritize information supporting established goals or positions, such as tending to share health content that aligns with group identity under social motivation (Rathje et al., 2023). This distinction emphasizes the importance of goal setting in reasoning processes and provides a key perspective for examining motivational biases in health information processing.

Regulatory focus theory offers another perspective, suggesting that motivation can also be classified based on regulatory strategies. This theory distinguishes between two self-regulatory motivational systems: promotion focus and prevention focus (Higgins, 1997). Sensitivity to outcomes is the fundamental difference between these orientations, with promotion focus being sensitive to positive outcomes and prevention focus to negative outcomes (Mühlberger et al., 2022). This regulatory focus also significantly affects information processing. Promotion-focused individuals are more likely to attend to information that can bring positive changes, such as benefits of nutritional interventions, whereas prevention-focused individuals are more sensitive to potential threats and tend to value warning content about disease prevention (Melbye & Hansen, 2015; Kumar et al., 2021; Tudoran et al., 2012). Both orientations can lead to selective reasoning but bias toward different information types. Regulatory focus theory reveals how different motivational systems influence information selection and reasoning direction, providing important supplements for understanding information preferences in health-related motivated reasoning.

Based on information life cycle theory (Cai et al., 2022), subsequent research has refined motivation types in health information processing along the temporal dimension (Wilson & Maceviciute, 2022). This perspective divides information

processing into different stages from generation to acceptance to dissemination, exploring dominant motivation differences at each stage. For instance, in the information generation stage, intrinsic motivation may prompt individuals to create health content consistent with their beliefs (Stehr et al., 2021), while in the acceptance and dissemination stages, accuracy motivation prompts individuals to verify information authenticity before making decisions (Ecker et al., 2023). Differences in motivation across stages may cause information selection and reasoning direction to evolve over time. The information life cycle perspective emphasizes that motivation's role in information processing is dynamic, and understanding this dynamic path can help design more precise health communication and intervention strategies.

The motivation types reviewed above in chronological order are not mutually exclusive but form complementary explanatory frameworks. In fact, a specific health motivation may be a combination of different motivation type characteristics. For example, the motivation to share health information for social purposes reflects both directional motivation and extrinsic motivation features, while also possessing prospective motivation attributes. Rather than relying on a single classification method, this paper combines multiple perspectives, emphasizing that different motivation types determine individuals' basic tendencies in information processing. Motivation not only triggers behavior but also guides individuals to bias toward specific conclusions in information selection, processing, and interpretation, becoming a key psychological foundation of health-related motivated reasoning by influencing their judgments of information authenticity and importance.

3 Influencing Factors of Health-Related Motivated Reasoning

Motivation classification provides a basic perspective for understanding health-related motivated reasoning. However, in actual reasoning processes, individuals' motivational characteristics are also jointly modulated by various internal and external factors. Based on conclusions from previous empirical studies (Dong et al., 2020; Klinenberg & Sherman, 2021) that health information reasoning processes often involve direct effects of individual characteristics and information attributes while also being influenced by specific cultural contexts, and drawing on classification methods from prior research (陈寿勇, 李静, 2024; 邱林波, 宛小昂, 2024), this paper roughly categorizes influencing factors into three major types: individual factors, informational factors, and cultural factors (Figure 1 [Figure 1: see original paper]), each shaping health-related motivated reasoning in unique ways. Individual factors tend to describe the dynamic sources of individual psychology and behavior, mainly including health beliefs, cognitive traits, and discrete emotions. Informational factors emphasize the nature and presentation of information itself, focusing primarily on information conflict and information framing. Cultural factors provide a more macro-level background perspective, involving social identity and cultural norms.

Figure 1 Integrated Framework of Health-Related Motivated Reasoning

Source: Created by the authors, with the mechanism portion adapted from Kahan (2016a).

3.1.1 Health Beliefs

Pre-existing health beliefs are important antecedents that determine motivated reasoning. Research shows that health beliefs not only influence how individuals evaluate health information but also affect their reasoning tendencies during information processing (Masarwa et al., 2023; Ward et al., 2009). For example, van Stekelenburg et al. (2020) found that when corrective information about vaccination or food safety contradicts individuals' original health beliefs, people are more likely to reject or ignore this information rather than rationally accept it. Similarly, Langford et al. (2018) noted that individuals' beliefs about the causes of hypertension affect their acceptance of related information, where those who believe behavioral factors are the main cause are more receptive to lifestyle recommendations, while those who attribute hypertension primarily to genetic factors tend to maintain original habits. In summary, pre-existing health beliefs may influence information screening and interpretation through health-related motivated reasoning, thereby shaping health decisions.

The Health Belief Model (HBM) provides a classic theoretical framework for predicting and explaining health behavior. Based on rational decision-making assumptions, this model posits that individuals form decisions through systematic evaluation of health threats (e.g., perceived susceptibility and severity) and behavioral utility (e.g., perceived benefits, barriers, and self-efficacy) (Rosenstock, 1974; Wang et al., 2022). However, research on health-related motivated reasoning indicates that actual decision-making processes often deviate from this rational assumption (Dibbets et al., 2021). When processing health information, individuals may employ reasoning strategies such as exaggerating behavioral barriers or underestimating disease risks to maintain existing behavior patterns (Kuhfeldt et al., 2024; Mercadante & Law, 2021), challenging the rational premise of HBM. For instance, smokers may acknowledge the dangers of smoking (consistent with HBM's "perceived severity") while simultaneously using health-related motivated reasoning such as "my genes are healthier" to deny personal susceptibility, thus continuing smoking behavior. Although HBM and health-related motivated reasoning are based on rational and irrational assumptions respectively, there exists potential for integration between the two perspectives. Parwati et al. (2021) demonstrated that motivational interviewing based on HBM can effectively reduce cognitive biases and improve health information adoption by enhancing self-efficacy and reducing perceived barriers. Future research should identify under what circumstances health decisions follow HBM's rational predictions, when they are susceptible to health-related motivated reasoning, how their interaction affects behavior change, and explore how to design interventions using HBM core elements (e.g., perceived benefits)

to mitigate irrational biases.

3.1.2 Cognitive Traits

Cognitive traits, encompassing personality characteristics and cognitive styles, influence health-related motivated reasoning. Individuals with different personality traits show marked differences in susceptibility to health-related motivated reasoning. Research finds that people with higher delusional tendencies tend to maintain emotionally favorable but inaccurate information to avoid risks associated with rejection (Rigoli et al., 2021), while individuals with high compulsive traits often repeatedly check health information, and this excessive self-monitoring reduces emotional motivation interference in information processing, actually facilitating reasoning rationality (Bensi et al., 2010). Other studies indicate that highly conscientious and agreeable individuals are more inclined to accept mainstream and authoritative health recommendations, reducing reasoning biases stemming from personal positions (Yao, 2022). Conversely, individuals with stronger narcissistic tendencies, due to their self-centered cognitive patterns, are more likely to generate biased interpretations in health contexts and become potential disseminators of false health information (Haupt et al., 2024). Thus, individuals with higher delusional tendencies and narcissism levels are more susceptible to health-related motivated reasoning, while those with high compulsive traits, strong conscientiousness, and high agreeableness are relatively less affected, with more rational information processing.

Active open-mindedness and analytical thinking in cognitive styles also play crucial roles in health-related motivated reasoning. Research confirms that active open-mindedness can reduce cognitive biases from motivated reasoning, making individuals more receptive to scientific consensus (Stenhouse et al., 2018). Southworth's research similarly shows that such individuals, by strengthening truth-seeking motivation, are more able to accept viewpoints challenging their existing beliefs, thus exhibiting lower reasoning bias tendencies. Likewise, subsequent research on analytical thinking reveals that individual differences in reasoning are primarily driven by analytical thinking ability rather than external situational factors like time pressure (Strömbäck et al., 2024; Viator et al., 2020). In one study evaluating data on a skin cream's effectiveness for treating rashes, participants with high analytical thinking ability could more accurately integrate evidence, making their data interpretations tend to support their prior views (Kahan et al., 2017). However, subsequent replication experiments (Maguire et al., 2022; Persson et al., 2021) failed to confirm significant associations between analytical thinking ability and motivated reasoning. These divergent results suggest that individuals' original beliefs may exert greater influence during reasoning processes. The above discrepancies reflect that health-related motivated reasoning may be comprehensively modulated by multiple factors. In summary, cognitive traits, particularly personality characteristics and cognitive styles, determine health-related motivated reasoning performance in different ways.

3.1.3 Discrete Emotions

Discrete emotions with different valences and arousal levels shape health-related motivated reasoning patterns. Discrete emotions refer to independent basic emotions with specific characteristics (e.g., joy, anger, fear; Boyer, 2023). Different valences of discrete emotions exert distinct effects on health-related motivated reasoning. Negative discrete emotions (e.g., anxiety) intensify attention to threatening information, prompting individuals to overestimate risks and ignore mitigating evidence, thereby exacerbating health-related motivated reasoning biases (Chen et al., 2021; Na et al., 2018). In health-related contexts, strong negative emotional reactions make individuals more likely to accept and disseminate health rumors consistent with their emotional states during information processing (Dong et al., 2020). Positive discrete emotions (e.g., optimism) may reduce defensive processing and enhance acceptance of counter-attitudinal information, thereby decreasing reasoning bias (Suhay & Erisen, 2018). Research shows that compared with negative emotions, positive emotions not only foster more positive attitudes and behavioral intentions but also indirectly improve rational acceptance of various health information types (Jin & Oh, 2022). Thus, negative emotions strengthen motivated reasoning tendencies, while positive emotions facilitate rational information processing.

The influence of emotional arousal on health-related motivated reasoning manifests through its regulation of attention, thereby affecting information processing. One study noted that public health advertisements with strong emotional arousal can enhance public perceptions of health information usefulness, thereby strengthening dissemination effectiveness (Lang & Yegiyen, 2008). Another study on obesity prevention further demonstrated that while high-arousal emotional experiences can attract more attention, they may cause information encoding difficulties. In contrast, moderately arousing negative emotions are more conducive to effective encoding and healthy dissemination of information, promoting rational analysis while capturing attention (Bailey et al., 2018). Therefore, moderate emotional arousal can enhance information acceptance while reducing bias in health-related motivated reasoning, promoting more rational decision-making processes. Future research could deeply explore the interactive effects of discrete emotions with different valences and arousal levels on individual health-related motivated reasoning.

3.2.1 Information Conflict

Conflicting health information can trigger motivated reasoning. This area has formed a relatively independent research field known as conflicting health information, which refers to contradictory or inconsistent conclusions or recommendations from different sources or studies about the same health topic or issue (Wang et al., 2024). Such information differs from widely studied health misinformation (also translated as false or inaccurate health information) in that it cannot be simply distinguished as true or false through logic alone; its veracity often remains ambiguous or has strong contextual limitations, making

generalizations difficult. For example, research on coffee's health effects yields inconsistent results, with some studies indicating that moderate consumption protects cardiovascular health and enhances cognitive function, while others warn of increased risks for osteoporosis and anxiety (Haigh & Birch, 2021; Ihekweazu, 2023; Nieber, 2017). Similar issues exist regarding whether the general population needs vitamin supplementation or whether red meat consumption has carcinogenic risks. When facing such ambiguous conflicting health information, individuals' motivated reasoning is often activated, leading to selective information processing.

The conflict and uncertainty of health information may affect motivated reasoning, causing individuals to selectively accept or reject information to alleviate cognitive discomfort (Chang, 2015). When encountering contradictory health research reports, motivated reasoning may manifest as biasing toward information supporting existing positions or rationalizing uncertain information to reduce anxiety (Zimbres et al., 2022). For instance, individuals may tend to accept studies supporting their dietary habits while ignoring or questioning contradictory evidence. Carpenter et al. (2016) categorized conflicting health information into thematic conflict, source quantity conflict, evidence heterogeneity, and temporal inconsistency, all of which may trigger motivated reasoning. For example, when conflicts arise between homogeneous sources (e.g., different health experts) and heterogeneous sources (e.g., experts vs. social media influencers), individuals are more likely to selectively believe one side based on identity or prior beliefs (Ahn & Kahlor, 2023). Overall, conflicting health information prompts individuals to process information through motivated reasoning by increasing uncertainty perception and triggering cognitive dissonance.

3.2.2 Information Framing

Information framing may determine health-related motivated reasoning. Different framing types affect information processing and responses by altering presentation methods. Current research primarily distinguishes between gain/loss framing and thematic/episodic framing effects on individual reasoning.

Under gain/loss framing, information can guide motivated reasoning by emphasizing either positive consequences of healthy behaviors (gain frame, e.g., "moderate weight loss will make you feel good") or negative consequences of unhealthy behaviors (loss frame, e.g., "excessive weight loss will cause negative emotions") (Van 't Riet et al., 2016). Research shows that when smokers receive gain-framed smoking cessation messages, their development needs and promotion orientation are more easily activated, triggering receptive reasoning toward the information and strengthening their willingness to adopt health recommendations. In contrast, loss frames activate safety needs and prevention orientation, evoking defensive motivated reasoning that makes individuals focus on threatening aspects of the message, producing resistance or denial responses (张凤华等, 2015). Compared with loss frames, gain frames are more helpful in reducing motivated avoidance and enhancing smoking cessation intentions, an ef-

fect also observed in cancer information dissemination (Jiang et al., 2021). This indicates that such framing not only changes information presentation but, more importantly, activates different motivational orientations, determining whether individuals adopt receptive or defensive reasoning modes (Cohen et al., 2017; Gallagher & Updegraff, 2012), thereby affecting health information acceptance.

Additionally, thematic and episodic framing may also constitute information frames that trigger health-related motivated reasoning. Thematic framing presents information in a macro, neutral manner, reducing individuals' motivation to maintain existing beliefs based on emotional bias. Episodic framing, by highlighting vivid narratives about individuals rather than groups, evokes emotional responses and strengthens tendencies to accept information consistent with existing beliefs (Boyer et al., 2024). Research shows that media coverage of health issues tends to adopt thematic framing, which may weaken individuals' attention to specific responsibilities and reduce their motivated engagement, whereas episodic narratives more easily trigger emotional resonance and motivated reactions, prompting self-centered information interpretation (Dorfman et al., 2005; Higgins et al., 2006; Ju et al., 2023). Therefore, episodic narratives tend to strengthen belief defense and biased processing, while thematic reporting may reduce motivated reasoning tendencies. In summary, information framing profoundly influences individuals' choices and preferences in health-related motivated reasoning by adjusting information presentation and expression methods and mobilizing different emotional and motivational response pathways, providing theoretical support for information intervention design.

3.3.1 Social Identity

Social identity plays a key role in health-related motivated reasoning, with its influence significantly shaped by the cultural context in which individuals are embedded, particularly identity or group identification. The identity-defensive cognition hypothesis has been developed to explain social identity's role in motivated reasoning. This hypothesis is constructed based on evolutionary psychology and utility maximization theory: from the former perspective, social identity satisfies individuals' basic needs for belonging and security (Bayes & Druckman, 2021); from the latter perspective, the benefits of selectively accepting information consistent with one's group position far outweigh the costs of rejecting it (Boyer et al., 2024). These phenomena reflect that individuals are influenced by group identity during information processing, selectively integrating information favorable to their group position to maintain positive group image and their own social identity. For example, research on traditional Chinese medicine topics shows that individuals' identification levels with traditional Chinese medicine significantly affect their information evaluation tendencies, with those having higher identification levels tending to give higher evaluations to positive cues about traditional Chinese medicine, while those with lower identification levels tend to emphasize or amplify negative cues (刘颖等, 2022).

In terms of research topics, since current health-related research predominantly focuses on Western countries, it mainly addresses motivated reasoning in political attitude formation regarding health issues, particularly concerning partisan or ideological identity. Numerous studies show that partisan identity leads to asymmetric motivated reasoning patterns and exacerbates polarization between partisan groups (Pennycook et al., 2022; Young et al., 2022). For instance, Gadarian et al. (2020) found that in Western cultural contexts, liberal individuals are more inclined than conservatives to adopt health protective measures and support epidemic prevention policies. Additionally, liberal individuals perform better on COVID-19 knowledge accuracy, while conservatives rely more on ideologically aligned media for health information (Sylvester, 2021). Further research reveals that the strength of motivated reasoning is driven not only by political identity but also by individuals' status within groups (Boyer et al., 2022). In other words, high-status group members are more strongly motivated by political identity, tending to selectively accept information supporting their group interests and reinforcing existing positions and social status. These findings emphasize the important role of political identity in health-related motivated reasoning, showing that identity not only affects individuals' acceptance of health information but may also intensify cognitive divergence between groups.

3.3.2 Cultural Norms

Cultural norms profoundly influence how individuals engage in health-related motivated reasoning. Extensive research shows that although gender differences in drinking behavior are common across different cultural norms, the degree and manifestation of these differences vary by culture, further affecting individuals' motivated reasoning patterns in drinking behavior (Holmila et al., 2005; Temmen & Crockett, 2020; Davis & Schlauch, 2024). Social norms and gender role expectations regarding drinking in different cultures may lead men and women to exhibit different motivational preferences in drinking decisions. For example, in some cultures where men are expected to drink more frequently, this may prompt stronger motivated reasoning to rationalize their behavior (Fugitt et al., 2017). Additionally, among adolescent populations, parenting styles within cultural contexts also affect motivated reasoning about unhealthy drinking. For instance, the warmth and rationality shared by authoritative and permissive parenting styles in certain cultures may serve as protective factors, effectively reducing adolescents' risk of developing drinking motivations (Garcia et al., 2020).

Similarly, cultural norms affect epidemic prevention behaviors, such as motivated reasoning in mask-wearing decisions. Driven by social norms, group pressure, and collective safety needs, individuals in collectivist cultures more easily selectively accept information supporting mask-wearing and ignore opposing viewpoints to conform to social expectations (Badillo-Goicoechea et al., 2021). Conversely, individuals in individualistic cultures tend to accept information emphasizing personal freedom and even rationalize choices not to wear masks (Lu et al., 2021). Moreover, this study found that in individualistic countries, re-

gions with collectivist atmospheres may still exhibit motivated reasoning due to cultural norms, thereby accepting the legitimacy of mask-wearing. This demonstrates that cultural norms influence health decisions by shaping individuals' health-related motivated reasoning.

3.4 Summary

The three categories of influencing factors summarized above all occupy important positions in health-related motivated reasoning. Specifically, at the individual level, health beliefs, cognitive traits, and discrete emotions with different valences or arousal levels affect reasoning processes in unique ways. At the information level, conflicting information, gain frames, and thematic frames are more likely to trigger public health-related motivated reasoning. At the cultural level, differential social identity and cultural norms exert varying degrees of constraint on individuals' health-related motivated reasoning. It should be noted that current research mostly examines the effects of single factors on health-related motivated reasoning, and systematic empirical testing of specific interactions among these three categories remains lacking, representing an area for future investigation.

4 Mechanisms of Health-Related Motivated Reasoning

Although previous sections have discussed the motivational foundations and conditional differences of health-related motivated reasoning from the perspectives of motivation types and moderating factors, its psychological essence remains to be further revealed. Only by clarifying the specific implementation pathways of such reasoning in information processing can we fully grasp its internal operational mechanisms and formation logic. Current research can combine traditional viewpoints with Bayesian model perspectives to further explore and explain the mechanisms of health-related motivated reasoning.

Early research confirmed that motivation influences reasoning by relying on biased cognitive processes—strategies for acquiring, constructing, and evaluating beliefs (Braman & Nelson, 2007; Epley & Gilovich, 2016). This view suggests that the mechanism of motivated reasoning mainly stems from cognitive biases (Taber & Lodge, 2006), where individuals tend to select and confirm information supporting their prior beliefs while avoiding counter-attitudinal or belief-challenging arguments (Dibbets et al., 2021; Dickinson & Kakoschke, 2021; Meppelink et al., 2019). Although traditional mechanisms can explain why individuals exhibit selective information processing, relying solely on the cognitive bias perspective has limitations, lacking dynamic depiction of belief updating processes and making it difficult to demonstrate under what circumstances individuals may update or maintain beliefs.

Recent theories attempt to explain health-related motivated reasoning using Bayesian models, viewing it as an irrational probability updating process (Damgaard & James, 2024; Priniski et al., 2022). This model not only

provides a new theoretical framework for understanding health-related motivated reasoning but also helps reveal why people systematically deviate from optimal decisions in specific contexts. According to Bayesian models, when accepting new information, individuals combine prior beliefs with the likelihood of new evidence to update and form posterior beliefs. As evidence accumulates, the posterior distribution will converge to the true parameter value (i.e., convergence to the truth; Tappin et al., 2020). In this model, individuals primarily update their beliefs objectively based on the authenticity and reliability of new information (Rigoli et al., 2021; Wojtowicz & DeDeo, 2020). However, in health-related motivated reasoning, individuals' processing of health information systematically deviates from standard Bayesian updating processes. Specifically, this process can be viewed as a "triple deviation" from rational Bayesian reasoning.

First, prior setting is motivation-driven and biased (Masarwa et al., 2023). For example, smokers may tend to assign low prior probability to "smoking causes cancer" to avoid cognitive dissonance from accepting this information. This deviation can be understood as the emotional value of a hypothesis (e.g., pleasure from smoking) interfering with the integration of objective statistical information. Second, evidence evaluation is selectively distorted by preference guidance (Yang et al., 2023). For instance, vaccine-hesitant individuals may tend to overestimate causal associations between post-vaccination discomfort and the vaccine itself (likelihood ratio inflation), while dieters may underestimate the impact of snack calories (likelihood ratio compression). This motivational effect causes individuals to selectively amplify or weaken relevant evidence. Third, posterior belief updating is directional (Piksa et al., 2024). Under the influence of health-related motivated reasoning, individuals emotionally "revise" the credibility of new evidence and consequently adjust and update posterior beliefs. Thus, health-related motivated reasoning exhibits bias in prior beliefs, selectivity in new evidence processing, and directionality in posterior belief updating.

Existing research has applied Bayesian models to explain health-related motivated reasoning processes (Priniski et al., 2022). In one study, researchers introduced participants to a salivary enzyme to be tested and informed them that the enzyme was associated with positive or negative health outcomes. Results showed that when participants believed the enzyme was associated with negative health outcomes, they were more inclined to question the test's reliability, whereas they were less skeptical when it was associated with positive outcomes (Ditto et al., 1998). This asymmetric performance between positive and negative evidence reflects the role of health-related motivated reasoning, indicating that health motivation causes individuals to assign different weights to different evidence types, thereby affecting belief adjustment magnitude. Similarly, Nyhan et al. (2014) found that corrective information about measles, mumps, and rubella vaccines, if failing to change the misconceptions of the most vaccine-skeptical individuals, would strengthen their false beliefs. This shows that health motivation not only affects evidence weighting but may also cause belief updating to deviate from the Bayesian optimal model, making individuals maintain original

beliefs even when facing contradictory evidence, or even strengthen prior beliefs. Other related studies have also examined health-related motivated reasoning within a Bayesian framework, exploring how people maintain original beliefs when evidence conflicts with their own views (Kahan, 2016a, 2016b). In summary, individuals assign higher weights to health information consistent with their positions and weaken the impact of contradictory information, ultimately causing posterior beliefs to deviate from rational expectations.

It should be noted that research placing health-related motivated reasoning within a Bayesian framework has mainly concentrated on theoretical development and extension, without completing specific computational modeling or providing experimental evidence support. Future research can explore this further.

The mechanisms of health-related motivated reasoning can be summarized from both individual cognition and Bayesian model perspectives. Specifically, the former focuses more on behavioral characteristics and manifestations of motivated reasoning, mostly from a static viewpoint, while the latter emphasizes modeling and explaining the process, focusing on dynamic adjustment of reasoning. The two are complementary: the former lays the theoretical foundation for motivated reasoning, emphasizing irrational processes; the latter provides a quantitative perspective for describing belief adjustment under subjective motivation influence, offering more precise analytical tools and methodological frameworks for health-related motivated reasoning research.

5 Research Outlook

As theoretical perspectives continue to deepen and research content gradually enriches, in-depth reflection and exploration of related issues remain urgently needed. Based on this, future research can focus on three directions. First, construct an interactive model of influencing factors for health-related motivated reasoning, examining interactions among individual traits, information characteristics, and cultural backgrounds. Second, deepen the application of Bayesian models in health-related motivated reasoning, exploring how different health motivation types affect Bayesian reasoning and identifying neural correlates of motivation-belief updating. Third, examine the role of health-related motivated reasoning in health intervention strategies, developing precise health intervention plans for different motivation types and challenges brought by the internet and intelligent era. Specific details are as follows.

5.1 Constructing an Interactive Model of Influencing Factors

Although existing research has revealed multiple influencing factors of health-related motivated reasoning, how factors at different levels interact and under what conditions they play key roles remain lacking in systematic theoretical integration. Future research could attempt to construct more integrated and interactive theoretical models to systematically explore interaction mechanisms

among individual traits, information characteristics, and cultural backgrounds.

For example, interaction effects between individual and information levels cannot be ignored in health-related motivated reasoning. Research suggests that neuroticism in personality traits and cognitive styles (e.g., field independence vs. dependence) may moderate how individuals process health information with different characteristics (e.g., emotional vs. neutral) (Haarmann et al., 2025; Mohammed et al., 2022; Pröllochs et al., 2021). Specifically, when health risk information has strong emotional coloring, individuals high in neuroticism and field dependence may more easily exhibit motivated reasoning responses such as selective reception, defensive processing, and emotion-driven cognitive distortion, often accepting information consistent with their existing beliefs. In contrast, individuals low in neuroticism and field independent are typically not significantly disturbed by emotional fluctuations and, when facing various information types, tend to evaluate information credibility based on rational analysis. These processes indicate that interactions between individual traits and information characteristics may jointly shape the intensity and direction of health-related motivated reasoning.

Furthermore, cultural background may also play an important role in this interactive process. For instance, in collectivist cultures, individuals emphasize group identity more, so when facing highly provocative group-related health information, emotional drive and cognitive bias are stronger, with tendencies to accept group-consistent information. In individualistic cultures, individuals rely more on rational evaluation, and even when information is highly provocative, emotional drive remains relatively stable, with judgments based more on information credibility. Future research could manipulate the provocative degree and cultural match of health information (Dryhurst et al., 2020; Zhang, 2021; Nestor & Woodhull, 2024; Pop-Flanja, 2020) to examine their interactive effects with individual characteristics (e.g., health beliefs, personality traits, emotional susceptibility) and explore how cultural backgrounds influence these interactive processes, thereby moderating pathways of health-related motivated reasoning. Validating this multiple-drive mechanism in cross-cultural contexts will not only help understand individual and group health behavior patterns in different cultural contexts but also provide theoretical foundations for developing more culturally adaptive health communication strategies and intervention plans.

5.2 Deepening Bayesian Model Applications in Health-Related Motivated Reasoning

The theoretical conception of health-related motivated reasoning under Bayesian models has built a highly promising framework for understanding individuals' health information processing, but its explanatory power still requires testing through more precise experimental designs. On one hand, empirical research can test how health motivation affects Bayesian reasoning. Different health motivation types may shape how individuals process health information by affecting

prior belief strength, evidence weight allocation, and posterior belief updating rates (Thaler, 2024). For example, research finds that individuals with “promotion focus” (e.g., hoping to maintain health) may have stronger prior beliefs and thus tend to maintain original beliefs relative to new information, while “prevention focus” individuals (e.g., avoiding disease), due to higher sensitivity to risk and negative information, may be more likely to consider information contradicting their beliefs and thus tend to adjust their beliefs (Tudoran et al., 2012). Future experiments could design different health motivation induction conditions, manipulating participants’ belief updating magnitude for identical health information to precisely measure the role of different health motivation types in Bayesian reasoning.

On the other hand, future research could introduce cognitive neuroscience methods to compensate for limitations of traditional behavioral research in exploring psychological mechanisms of health-related motivated reasoning. For example, using functional magnetic resonance imaging (fMRI), researchers could reveal biased processing characteristics at the neural level when individuals receive threatening health information, thereby expanding understanding dimensions of health-related motivated reasoning. Existing studies show that motivated reasoning involves coordinated activity in multiple brain regions, particularly neural networks related to motivational drive, emotional processing, cognitive control, and belief updating, such as the prefrontal cortex, cingulate gyrus, striatum, and amygdala (Ji et al., 2021; Lois et al., 2024; Prado et al., 2020). Combining fMRI with Bayesian models, future research could further explore the mechanisms of specific brain regions in belief updating. For instance, task-state fMRI could record individuals’ neural responses when receiving health information, extracting prefrontal cortex activation levels as parameters for posterior belief adjustment to quantify health motivation’s impact on Bayesian reasoning processes. Additionally, neuroimaging methods can reveal functional connectivity patterns between different brain regions, providing evidence for understanding network interactions in motivated reasoning. Future research could apply dynamic causal modeling or functional connectivity analysis (Lyu et al., 2021) to examine interactions between motivation-regulation-related brain regions (e.g., amygdala) and cognitive control regions (e.g., prefrontal cortex). If individuals with stronger health motivation show enhanced connectivity between relevant brain regions when receiving unfavorable health information, this may indicate that they mobilize more neural resources at the biological level to maintain existing beliefs, providing support for understanding the neural implementation pathways of belief updating bias in health-related motivated reasoning. Overall, cognitive neuroscience methods can not only verify the neural basis of health-related motivated reasoning processes but also provide biological foundations for intervention strategies, such as improving individuals’ acceptance and processing of health information by modulating activity patterns in specific brain regions, thereby enhancing health communication effectiveness.

5.3 Examining the Role of Health-Related Motivated Reasoning in Health Intervention Strategies

Individuals often attend to information consistent with their own motivations during health decision-making, a characteristic that can be leveraged to optimize health intervention strategies. Different motivation types may require matching health intervention strategies. For example, for intrinsically motivated individuals (Alqahtani et al., 2023), interactive health education programs or knowledge competitions could be designed to enhance their motivation to actively acquire health information. For extrinsically motivated individuals (van Velsen et al., 2019), social norm interventions (e.g., prompting that “80% of people have adopted healthy behaviors”) or reward mechanisms (e.g., point redemption for health products) could improve intervention effectiveness. Emotion-driven intervention strategies also warrant attention. Numerous studies indicate that public health interventions can promote population health behaviors by eliciting specific emotions (Martino et al., 2024; McNeil & Purdon, 2022; Zhang & Liao, 2021). For example, moderate fear appeals help enhance health risk perception (Ho et al., 2021; Sun et al., 2021), and future research could further explore how motivated reasoning affects long-term health behavior maintenance. Meanwhile, to reduce negative effects of health-related motivated reasoning, future health intervention research could explore cognitive restructuring intervention strategies (de Mooij et al., 2023) to help individuals re-evaluate health information reliability. Additionally, improving health information transparency and cultivating public critical thinking skills can help reduce adverse effects of motivated reasoning.

The internet and intelligent era also bring new challenges to health intervention strategies, particularly information cocoons and collective public opinion issues. The former exacerbates individuals’ 固守 of their own health concepts and shows stronger rejection of heterogeneous viewpoints (Yang et al., 2024). The latter reinforces internal biases through group pressure, thereby inhibiting acceptance of out-group perspectives (Mei et al., 2020). Future research could explore health information optimization strategies in information cocoon environments, such as moderately introducing heterogeneous viewpoints during recommendation processes to achieve debiased information 推送, thereby reducing interference of information polarization in health decision-making. Additionally, social network experiments could analyze individuals’ health information acceptance patterns under group pressure and further explore how to reduce adverse effects of group polarization on health information dissemination by enhancing group diversity and guiding critical thinking. Moreover, special populations such as older adults and chronic disease patients, limited by their physiological and psychological characteristics, are more vulnerable to misinformation or bias when facing online health information (Liu et al., 2024; Miller et al., 2023; Wang et al., 2021). Future research could develop health application interfaces better suited to older adults’ cognitive characteristics or combine online and offline health education methods to improve their health information discrimination

abilities. Contextualized health intervention strategies could also be explored, such as dynamically adjusting health information expression methods according to chronic disease patients' emotional states to enhance information acceptability and persuasiveness. This exploration also aligns highly with the core concepts emphasized in the "Healthy China 2030" strategy, such as people-centeredness and precision health communication.

In conclusion, health-related motivated reasoning has important influences on individual health information processing and decision-making, with its manifestations not being fixed but dynamically evolving and shaped by multiple factors. This paper systematically introduces classification models of health motivation, influencing factors of health-related motivated reasoning, and mechanisms based on Bayesian model perspectives, providing a framework for comprehensively understanding the theoretical foundations, driving conditions, and operational mechanisms of health-related motivated reasoning. By systematically reviewing personal factors, information characteristics, and socio-cultural backgrounds, this paper reveals the dynamic role of health-related motivated reasoning in health information processing and explains how health motivation affects individuals' information weight calculations, leading to varying degrees of reasoning bias based on Bayesian reasoning models. Future research should integrate personal characteristics, information attributes, and socio-cultural backgrounds to reveal their interactive effects and similarities/differences across contexts in shaping health-related motivated reasoning, combine cognitive neuroscience methods to validate the applicability of Bayesian models, and expand their applications in health communication and behavioral intervention.

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