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**Beyond First Impressions: Understanding the Relationship between Cognitive Load, Cognitive Reflection and False Consensus Effect**

IN6208 Research Methods & Data Analysis

for Information Professionals

Research Proposal

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**Abstract**

This study investigates the relationship between cognitive load and the false consensus effect (FCE), examining how cognitive reflection moderates this relationship. While previous research has established that cognitive load influences various cognitive biases, its impact on FCE remains unexplored. In today’s information-rich environment, where cognitive demands are increasingly high, this research is relevant in helping individuals recognize how cognitive load may influence their judgments about the extent of agreement with others. Using a sample of 22 graduate students from NTU, this study measures cognitive load through self-reported assessments, FCE through the discrepancy between estimated and actual consensus, and cognitive reflection using the Cognitive Reflection Test (CRT). We hypothesize that higher cognitive load increases FCE, and that individuals with higher cognitive reflection are better able to resist this bias even under high cognitive load. The study addresses a significant gap in understanding how mental strain affects social judgment and consensus estimation. The findings will have practical implications for various fields, including education, where teachers must avoid overestimating student comprehension, and leadership, where accurate judgment of others' perspectives is crucial. This research may contribute to both theoretical understanding of cognitive biases and practical applications in decision-making and interpersonal dynamics.

**Introduction**

Tversky and Kahneman (1974) first proposed the concept of cognitive load in their publication "Judgment under Uncertainty: Heuristics and Biases." They demonstrated how humans typically use a small set of heuristic concepts to compress difficult jobs into more manageable judgment operations when determining the likelihood of uncertain events or the value of unknown quantities. The representativeness heuristic, availability heuristic, and anchoring and adjustment heuristic are the three main cognitive heuristics that they methodically introduced. They also discussed how these heuristics contribute to systemic biases in decision-making.

One of the systemic biases that individuals often experience, influenced by these cognitive heuristics, is the false consensus effect (FCE). When Ross (1977) originally investigated FCE, he discovered that "social observers tend to perceive a 'false consensus' regarding the relative commonness of their own responses." Later studies have indicated a connection between the availability heuristic and FCE, even though Lee did not explicitly mention it in his study. Notably, Marks and Miller (1987) concluded that four theoretical perspectives—selective exposure and cognitive availability, salience and attentional focus, logical information processing, and motivational processes—can be used to analyze a large portion of the research on FCE and related biases in social perception (such as assumed similarity and overestimation of consensus). They admitted that these viewpoints might not operate separately but rather overlap, indicating that cognitive availability—which is strongly linked to the availability heuristic—may be a component in the false-consensus bias. For this reason, FCE is frequently thought of as an example of cognitive bias.

Salience and attentional focus, on the other hand, show that people have limited attentional resources and can usually only focus on the most salient information when their cognitive load is high. Because of this restriction, people may become swayed by their own opinions and overestimate the possibility that others share them.

Paas and Van Merriënboer (1994) went on to discuss cognitive load as "a multidimensional construct that represents the load that performing a particular task imposes on the cognitive system of a learner." According to Chandler and Sweller (1991), cognitive load can take the form of "the complexity of the knowledge being acquired" or "the manner in which information is presented." Numerous social biases, such as the central tendency bias (Allred et al., 2016) and the social desirability bias (Stodel, 2015), have been shown to be impacted by cognitive load.

Studies specifically looking at the connection between cognitive load and FCE, however, seem to be lacking. People usually suffer from increased cognitive load in today's fast-paced, information-rich environment. Continuous decision-making and prioritization are required due to the tremendous demands placed on cognitive resources by the quick development of technology and the steady stream of information from news sources, social media, and digital communication. Reduced cognitive efficiency and mental exhaustion may result from the abundance of information available.

Frederick (2005) defined "cognitive reflection" as "the ability or disposition to resist reporting the response that first comes to mind." As a framework for cognitive reflection, he also suggested "The Cognitive Reflection Test (CRT)" to evaluate an individual's capacity to think more deeply and control automatic responses when confronted with options and difficulties. By analyzing CRT scores, researchers can examine reflective ability in cognitive decision-making and its relationship to choice biases. Given that FCE primarily involves heuristic thinking, and that cognitive reflection reflects an individual's inclination to use either intuitive responses or deeper reasoning, cognitive reflection may play a role in the relationship between cognitive load and FCE.

Therefore, this paper's goal is to examine how cognitive load affects the level of FCE and whether individual differences in cognitive reflection moderate this relationship.

FCE has a substantial impact on how people project their preferences and beliefs onto other people, which affects communication, perceptions, and decision-making in a variety of domains. For instance, political elites frequently display egocentric biases, whereby their assessments of public opinion reflect their own opinions rather than those of the broader public, according to Broockman and Skovron (2023). Because leaders may exaggerate the degree to which voters share their political preferences, these biases can result in poor policy judgments. Similar to this, marketing experts frequently project their preferences onto consumers, which results in erroneous market assessments and unsuccessful strategies, according to Meyer and Markman (2022). According to Prelec and Bodapati (2020), people usually exaggerate how popular celebrities they admire are, which affects voting patterns, fan interaction, and marketing tactics used by the entertainment sector. These past studies highlight the FCE’s pervasive influence on judgment accuracy across a range of domains, influencing interactions and interpersonal impressions. Consequently, studying how cognitive load affects the level of FCE is crucial, especially in the fast-paced, information-rich world of today.

**Literature Review**

*Cognitive Load*

Past research has demonstrated that cognitive load influences various cognitive biases, but its effects are not uniform. For instance, Allred et al. (2016) found that increased cognitive load heightens the central tendency bias, where individuals’ judgments tend to gravitate toward the average of available options. In contrast, Stodel (2015) concluded that cognitive load reduces the influence of social desirability bias, as the added mental strain makes it more difficult for individuals to present themselves in a socially favorable manner. Despite these findings, there is little research specifically addressing the impact of cognitive load on the false consensus effect (FCE). This gap in the literature leaves the cognitive mechanisms underlying agreement-based biases, such as FCE, largely unexplored.

*False Consensus Effect (FCE)*

Past research on the FCE mainly focuses on four main areas: the nature of false consensus, influencing factors, mitigation strategies, and specific scenarios where FCE is observed.

First, regarding the nature of false consensus, Ross el al. (1977) demonstrated that FCE has been observed in both hypothetical situations and real conflict scenarios, indicating the widespread impact on social perception and inference processes. While the illusion of consensus is widespread, Desai el al. (2022) shows that individuals do have the capacity to differentiate between true and false consensus.

Second, several influencing factors affecting the magnitude of FCE were discovered and discussed. Squillante & Ventre (2010) shows that the description of the choice option and the form of the judgment task have an impact on the magnitude of the agreement in the case of the presence of the FCE. Coleman (2018) investigated the impact of emotions on the FCE by manipulating emotions into three states: happiness, neutrality, and sadness through an emotion induction method. Additionally, Bunker & Varnum (2021) found that heavier use of social media was associated with stronger FCE.

Third, research has also explored factors that moderate the relationship between independent variables and FCE, offering insights into how to mitigate this effect. Wojcieszak & Price (2009) found that encountering disagreement can attenuate the association between individual opinions and FCE. Selart et al. (2020) studied FCE in management and found that team mindfulness, when combined with team processes such as open-mindedness, participation, empowerment, conflict management, and value and ambiguity tolerance, can help reduce false consensus, although team mindfulness alone may not guarantee effective decision-making.

Lastly, FCE has been observed in several specific scenarios. Collisson et al. (2021) found that when estimating celebrity popularity, people tend to overestimate the popularity of celebrities they favor. In marketing, Herzog et al. (2022) discovered that professionals often project their preferences onto customers, but this tendency can be reduced by advising them to suppress personal biases, particularly when preferences are certain. Matsuo et al. (2023) conducted studies in Japan that indicate the existence of false consensus in the ranking of moral foundations, with participants estimating others' values similarly to their own.

However, the role of cognitive load has not been fully explored, and we believe it is an important factor with potential impact on FCE.

*Cognitive Reflection*

Frederick (2005) defines the Cognitive Reflection Test (CRT) as a kind of measurement of cognitive reflection, which is "the ability or disposition to resist reporting the response that first comes to mind". Toplak et al. (2011) showed that "the CRT is a more potent predictor of performance on a wide sample of tasks from the heuristics-and-biases literature than measures of cognitive ability, thinking dispositions, and executive functioning." In summary, cognitive reflection captures the peoples' ability to override intuitive responses, and CRT test is prevalently used in cognitive reflection related research.

Baldi et al. (2013) showed that "cognitive reflection is associated with a reduction of decision-making bias associated with social status". Coutinho et al. (2021) studied the role of cognitive reflection in the Dunning-Kruger effect. Participants with low cognitive reflection ability are most likely to overestimate their performance, while participants with high cognitive reflection ability tend to slightly underestimate their performance. Ferreira et al. (2023) proposed that people often exhibit the base rate fallacy in judgment tasks by relying on stereotypes and ignoring prior probabilities, whereas those with higher cognitive reflection ability are better at avoiding this fallacy, showing smaller deviations and being closer to the Bayesian solution. However, no studies have looked at the relationship between cognitive reflection, cognitive load and FCE, which provides a unique perspective for our study to explore this potential relationship.

**Research Goal**

*Research Objective*

The objective of this study is to examine the relationship between cognitive load and false consensus effect, and how individuals' cognitive reflection may moderate this relationship.

*Hypotheses*

Herlan, Triana, and Suhardi (2020) suggest that under conditions of high cognitive load, individuals are more prone to making heuristic judgments, using mental shortcuts rather than engaging in more deliberate, analytical thinking. This reliance on heuristics can increase judgment errors, particularly in situations where individuals need to estimate others’ preferences or beliefs. Dale (2015) further argues that "relying on existing heuristics can make it difficult to see alternative solutions," which means that individuals under cognitive strain are more likely to stick with their initial assumptions and overestimate how much others agree with them. In the context of FCE, this could manifest as individuals projecting their own opinions onto others without considering diverse viewpoints, especially when cognitive load limits their ability to process information thoroughly. Consequently, we hypothesize that higher cognitive load will exacerbate FCE, as individuals fall back on their own perspectives to simplify decision-making under pressure.

**H1**: There exists a positive relationship between the level of cognitive load and individuals' false consensus effect.

As proposed by Frederick (2005), people with high cognitive reflection, have better abilities to resist intuitive responses. According to Jalbert & Pillai (2024), people with higher CRT scores (which reflects higher cognitive reflection) may be better able to use their cognitive resources to mitigate the effects of fluency when making judgments about consensus. Fluency here refers to the familiarity and efficiency of information processing. When people are faced with new information, their fluency is low and they usually need to spend more energy to process it; but after repeated encounters with the information, fluency becomes high, and people may intuitively use the previous processing methods of the information, thereby reducing thinking about the information and falling into heuristic thinking. Therefore, people with high cognitive reflection may be less likely to rely on heuristic shortcuts even under high cognitive load, which may reduce their likelihood of overestimating consensus, better resist bias, and reduce the strength of the false consensus effect. Therefore, we speculate that cognitive reflection (indicated by CRT scores) can moderate the impact of cognitive load on the false consensus effect.

**H2**: Individuals' cognitive reflection moderates the relationship between cognitive load and false consensus effect.

**Methodology**

*Operationalization of constructs*

The key constructs examined in this research—cognitive load, false consensus effect (FCE), and cognitive reflection—are operationalized based on established frameworks from past literature to ensure consistency and reliability. Firstly, in this study, cognitive load is operationalized based on the complexity of question descriptions, following the framework proposed by Chandler and Sweller (1991). As mentioned previously, cognitive load refers to the mental effort required to process information, and it can be influenced by factors such as the difficulty of the task and the clarity of the instructions. To capture this, respondents will first be provided with a clear definition of cognitive load, ensuring they understand its meaning in the context of this research. After completing each question, they will be asked to reflect on their cognitive experience and rate the level of cognitive load they encountered. This self-reported rating reflects the respondents' own assessment of the mental effort involved, allowing us to measure cognitive load based on their subjective experience rather than the presumed level of difficulty set by the research designers.

Secondly, FCE is measured by the discrepancy between respondents’ estimates of how many others share their opinion and the actual consensus. This method has been widely used in prior research, including studies by Ross, Greene, and House (1977), Kim and Sundar (2020), and Niiya and Kurisu (2020). To calculate FCE of each respondent, the following formula will be used:

FCE = (estimated percentage of people with same choice − actual percentage of people with same choice).

Lastly, the cognitive reflection will be measured using the Cognitive Reflection Test (CRT). CRT specifically measures an individual's ability to hold back instinctive, immediate responses, which can reveal their level of cognitive reflection (Frederick, 2005). CRT contains three questions, initially developed by Frederick (2005). Each question presents an intuitive yet misleading response, which participants must reflect on to recognize as incorrect. Despite the simplicity of the required mathematical operations, many individuals perform poorly on the CRT (Sirota et al., 2015). However, given that our respondents are graduate students from science and technology backgrounds, we will classify participants who score full marks as having high cognitive reflection, while those who answer at least one question incorrectly will be considered to exhibit a low cognitive reflection. Table 1 lists the 3 CRT questions introduced by Frederick (2005), with their misleading response and correct answers.

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| --- | --- | --- |
| **CRT Question** | **Intuitive answer** | **Correct answer** |
| “A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? \_\_\_\_\_ cents.” | 10 cents | 5 cents |
| “If it takes 5 machines 5 min to make 5 widgets, how long would it take 100 machines to make 100 widgets? \_\_\_\_\_ min.” | 100 min | 5 min |
| “In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?” | 24 days | 47 days |

Table 1. CRT questions and answers

*Data Collection*

In the data collection phase, we design the survey questions and establish sampling criteria to reduce bias and strengthen the reliability of FCE measurement. Questions are chosen based on having a low actual consensus, since FCE is diminished when actual consensus of the question is high (Kałużna-Wielobób & Mudyń, 2017).​ A pilot study will be conducted to assess whether the questions varied in their perceived cognitive load from respondents’ perspectives and to capture the level of actual consensus to avoid high actual consensus questions.

To mitigate potential biases from convenience sampling, we reviewed past research to understand the influence of common demographic factors on FCE. According to Kałużna-Wielobób and Mudyń (2017), gender does not significantly impact FCE levels. While their research suggests that FCE tends to weaken with age, this factor is unlikely to be relevant for our study, as our sample population is relatively homogeneous in terms of age. Therefore, we do not expect age to have a significant effect on our findings.

In this study, 22 graduate students from NTU will be invited to participate. They will be randomly divided into two groups, and each group will be answering one version of the survey. Studies by Marks and Miller (1987), Ross et al. (1977), and Krueger and Clement (1994) have demonstrated that university students tend to overestimate the degree to which others share their opinions, which support the existence of FCE among our respondents.

**Potential Contributions**

This study seeks to understand the relationship between cognitive load, the false consensus effect (FCE), and cognitive reflection, focusing on how self-reported cognitive load affects individuals’ perception of consensus. Our research addresses a significant gap by examining how self-estimated cognitive load influences FCE, particularly within environments that encourage reflection and analytical thinking. This is especially relevant in today’s information-dense contexts, where even perceived mental strain can shape how accurately people assess others' views.

From a theoretical perspective, the study addresses how perceived cognitive load influences FCE and the moderating role of cognitive reflection. By introducing perceived cognitive load and CRT scores as indicators of cognitive processing, this study explores how individuals with different reflection abilities respond to cognitive strain and biases. Past studies have shown that people, particularly university students, often overestimate agreement with their own views, leading to biases in everyday decisions and social interactions. For instance, students under cognitive strain during an exam period might overestimate the extent to which peers share their specific opinions on a complex academic topic. Believing that their classmates largely agree with their stance, they may make assumptions about group study dynamics, potentially leading to miscommunication or lack of engagement when opinions differ. Thus, this research contributes to the psychological literature on how individual perception of cognitive load impacts bias, particularly in relation to social alignment and interpersonal expectations.

Practically, this research has implications across education, decision-making, and interpersonal dynamics. In educational settings, for instance, understanding the impact of cognitive load on FCE could help teachers tailor their methods to avoid overestimating student comprehension based on their own knowledge. As Moos and Marroquin (2010) highlighted, managing extraneous cognitive load is essential in multimedia learning environments, where overloaded working memory can hinder effective learning. This understanding can also improve decision-making in fields like leadership, negotiation, and emergency response, where clearer information presentation and effective cognitive load management are critical for accurate judgment of others' intentions or needs.

Ultimately, our research aims to provide insights that encourage individuals to reflect more accurately on social agreement, fostering better interpersonal connections and reducing conflicts based on false assumptions.

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