
Practice-Oriented Paper

Reducing the Negative Impact of Cognitive Biases on Critical Thinking Instruction

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In recent years, the concept of cognitive bias has become fairly well known amongst teachers and they are also generally aware that such bias can have negative outcomes for critical thinking. However, the question of what to do about such problems caused by cognitive bias in the classroom is one many teachers wonder about. This article firstly provides background knowledge important for considering how to take action in countering the negative impact of cognitive bias on student classroom critical thinking tasks and the student decision making processes involved in these tasks. Next, the specific challenges in mitigating these biases' associated negative impacts are discussed. The article proposes that mitigation of the negative effects of cognitive bias in the classroom can be a difficult task due to two main obstacles. Firstly, in many cases cognitive bias filters thinking at an unconscious level which makes any conscious awareness of, and reaction to, the influence of the bias a daunting task. The second obstacle is the sheer number of potential biases that could be manifesting in different students at different times. To respond to these challenges in mitigating cognitive bias, this article suggests a classroom approach teachers could take based on what is currently known about reducing these biases. The strategy is to implement consistent blanket interventions that will act to reduce the potential negative impact of various cognitive biases on important factors for successful classroom critical thinking tasks. One significant negative outcome of a number of cognitive biases for critical thinking is examined, providing sample lessons to illustrate how the approach can be applied. Finally, some of the issues for teachers concerning the future direction of cognitive bias mitigation in critical thinking teaching are explored.

With the publication of bestselling books such as *Thinking, Fast and Slow* (2011) by Economic Sciences Nobel Prize winner Daniel Kahneman and *Predictably Irrational* (Ariely & Jones, 2008) which explored evidence on how the mind can

make consistently seemingly irrational choices, the notion of cognitive bias has become generally well known to people interested in effective thinking practices in areas including medicine, business, and education. A cognitive bias is generally understood to be a distorted or unbalanced cognitive interpretation of reality that can lead to benefits or desired outcomes for the individual, but can also come with other undesirable outcomes. Bias is often at the unconscious level of thinking processes which means that conscious detection is very difficult, and secondly, that bias often acts to work as a filter on conscious thought (Kristal & Santos, 2021). For example, the tendency known as the in-group bias. This cognitive bias gives people a preference for their in-groups. This bias has been useful throughout long human existence as hunter gatherers because it has primarily been in-groups that have supported and protected people and it is to their benefit to favor their in-groups. However, in-group bias can also have troubling negative outcomes for a modern society in which diverse communities and peoples live together in one place or as one nation potentially contributing to unfairness, discrimination, and tribalism (Wright, 2013).

While whether a cognitive bias represents an “error” in that it can misrepresent reality, or is on the other hand a successful adaptive cognitive strategy, can depend on which field of study the question is approached from, there is little doubt that cognitive biases can have potentially negative influences that are problematic for critical thinking.

Paul and Elder define critical thinking as “the art of analyzing and evaluating thinking with a view to improving it” (2001, p. 2). Within this broad definition, some of the skills that teachers believe have value for practicing and developing critical thinking are perspective taking, evaluating evidence, a questioning stance, considering assumptions, and fairmindedness. However, one example of a problem emerging from cognitive bias for such critical thinking can be seen in *myside bias* defined by Mercier as, “people have a myside bias: a tendency to find arguments that defend their position, whether this entails supporting a position they agree with, or refuting a position they disagree with” (2017, p. 107). A myside bias which results in a preference for egocentric desirable interpretations can work powerfully against an unbiased examination and interpretation of

facts and evidence. This raises serious problems for the analyzing and evaluating process of critical thinking. Another example can be seen in the *halo effect* (Nisbett & Wilson, 1977; Bak, 2010) which is, for example, when a positive impression of a person (attractiveness, confidence, or seeming expertise) has an effect on how the opinions of that person are regarded and evaluated. For critical thinking this can mean the withholding of different or unpopular opinions due to hesitation in not wanting to offend someone well-regarded, or that a well-regarded person's opinion is given more weight than it actually deserves. In order to evaluate thinking, one important strategy is to compare that thinking fairly against other diverse and differing perspectives. The halo effect has the potential to be a significant obstacle in achieving this critical thinking goal.

In regard to the pedagogical issues concerning cognitive bias and critical thinking, it is firstly important for teachers to understand how cognitive bias works and the potential negative outcomes of cognitive biases on critical thinking tasks and student thinking dispositions. Then, teachers can look to more practical considerations as to how to mitigate or prevent the negative impact of these cognitive biases on their classroom critical thinking tasks and how to teach their students to self-mitigate these negative effects. This article reflects on the author's work exploring the current body of research on cognitive bias and consideration of approaches on how to buffer critical thinking tasks against the potential negative outcomes of the effects of various cognitive biases. Based on this, the article makes recommendations for realistic approaches that are practical and easily implemented into a teacher's critical thinking teaching approach.

Debiasing

One usage of the term "debiasing" is to refer to attempts made to prevent or mitigate the negative impact of cognitive bias. One approach to such debiasing might be to carefully monitor a class, identify the bias as it emerges, and then react to any potential negative impact by applying a debiasing technique. In general, this kind of reactive intervention can be an effective strategy in the classroom. For example, a teacher may notice that a classroom discussion is not moving

forward smoothly and react to that by applying an intervention to redirect or reignite the discussion momentum. However, the challenging difficulty of this kind of reactive approach in addressing cognitive bias has been noted in previous work (Beaulac & Kenyon, 2018). In an environment as complex as a classroom, it is practically impossible to identify a single cognitive bias that is negatively impacting on a task or thinking process. This is because it would involve being able to decipher the mental state of the student and identify which cognitive bias, or more likely multiple biases, they were being influenced by. Even if this was possible for a single student, the teacher would then be faced with the challenge of doing this for a class of students. A much more practical approach is to assume that because cognitive biases are such an integral part of thinking processes, they will emerge and have frameworks already in place that will act to reduce the potential negative impacts if they do.

This approach has been applied in other settings. For example, several public orchestras such as the New York Philharmonic hold blinded anonymous auditions behind a screen as a way to counter any potential bias due to gender, race, or appearance. The goal is not to target a single bias but use a blanket strategy approach that will target and reduce a range of bias. The strategy does not try to predict and identify biases emerging, it assumes the possibility of bias and has an intervention in place prior to the audition that will act to prevent or reduce influence of race, gender, or appearance bias. Another application is when teachers use blind grading. When grading, it is likely that teachers are being affected by cognitive biases that they are unaware of, by removing names when grading essays or other student work teachers can counter in advance the potential negative effect of a number of biases on them that could be triggered by previous associations with the student.

Cognitive Bias and Open-mindedness

It is generally recognized that open-mindedness is a valuable disposition for critical thinking (Southworth, 2021). However, one of the negative outcomes of several cognitive biases is reduced open-mindedness. As discussed earlier, myside bias creates a tendency for people to give more weight to their own preferred opinions

and beliefs, thus potentially reducing their openness to a range of perspectives. The halo effect can work to inflate the value of the opinions of attractive, confident, and well-regarded people and also thus reduce the consideration of various diverse and perhaps unpopular viewpoints. Other biases can also reduce open-mindedness. One example is the *authority bias* (Cialdini, 2007). This bias is when people hesitate to question, or confer greater accuracy and weight to, the opinions of a perceived authority figure. This could emerge in a classroom setting when a student is designated as the “leader” or has clearly superior communicative skills. In addition to the biases briefly mentioned here, there are many other cognitive biases that could reduce open-mindedness. Therefore, if teachers structure their critical thinking approaches and discrete tasks to include consistent attention to *promoting* open-mindedness, teachers can be reasonably confident that they will have strategies in place that will reduce the negative impact on open-mindedness of a considerably large group of cognitive biases that might influence thinking processes and outcomes. In previous work, blanket strategies that will work to mitigate any emerging negative outcomes due to groups of cognitive biases have been noted as a practical strategy for debiasing (Beulac & Kenyon, 2018) and practical classroom ideas based on this approach have been recently suggested (Peloghitis & Smith, 2020; Smith & Peloghitis, 2020)

There is a large body of evidence in the critical thinking literature supporting the promotion of open-mindedness. Thus, teachers can safely incorporate open-mindedness promoting tasks into their lesson structure without overly worrying about negative outcomes. Below are two sample lesson plans that have included consistent attention to promoting open-mindedness in the planning to prevent or reduce any potential negative effects of cognitive bias on open-mindedness.

a) Sample lesson 1 for college beginner level students

Goal - discussing the “best” pet

Step 1 - brainstorming individually - avoid e.g., groupthink / halo effect

Step 2 - collect ideas and present anonymously via e.g., via Google docs

Step 3 - create red teams* whose job it is to ask for reasons for all pet ideas

Step 4 - rank top ten pets

Step 5 - stop the discussion and introduce a few unusual pets for students to

discuss

* a red team is a person or group whose assigned role in a discussion is to ask for reasons, ask questions, and challenge ideas

b) Sample lesson 2 – for more advanced level students, developing an argumentative essay position

Step 1 - have students individually research sides of an issue - avoid e.g., myside bias / halo effect

Step 2 - collect pros and cons, present them anonymously via e.g., Google docs

Step 3 - create red teams to challenge the pros and cons

Step 4 - require students to underline or re-read arguments they do not agree with

Step 5 - students review the class notes and then decide their individual essay position

In the above steps of sample lessons a and b, at times cognitive biases such as the myside bias, halo effect, and authority bias may be emerging and having a negative impact on the task by reducing open-mindedness. However, it should be recognized that they also may not. With the various open-mindedness promoting tasks in place beforehand, the practically impossible task of trying to identify if, when, and which cognitive bias is emerging in the class or in student thinking and then applying mitigating strategies does not fall upon the teacher. The open-mindedness promoting tasks will reduce to some extent any negative effects on open-mindedness.

Individual brainstorming before group work, which is included in the first steps of both lesson plans above, also has the potential to sidestep a large number of the social cognitive biases that are activated when groups form and thus promote greater open-mindedness. In general, group brainstorming as a first step in a creative process to generate ideas has been shown to be not that successful. Sawyer comments, “multiple studies have confirmed ... that brainstorming groups, on average, generate half as many ideas as a similar number of solitary individuals” (p.236, 2011). As humans are primarily social animals, a significant number of influential cognitive biases are connected to social contexts. For

example, these social cognitive biases include the halo effect, groupthink, in-group bias, courtesy bias, authority bias and many others. While it is impossible to say definitively that these biases will appear and work to reduce the success of the group work, by taking away the group element the potential for this is largely removed. For teachers, starting with individual brainstorming and then moving to activities such as sharing and reviewing ideas, debating reasons, and/or ranking the ideas in groups is likely to result in better outcomes for these kinds of critical and creative thinking tasks.

For teachers concerned about and interested in mitigating the negative effects of cognitive bias the problem can be made manageable by firstly identifying key important negative outcomes for critical thinking potentially stemming from cognitive bias, e.g., open-mindedness. If teachers then incorporate appropriate and consistent environmental interventions aiming at generally promoting positive thinking behaviors that will counter these potentially key negative outcomes, then they can be reasonably confident that they are countering these negative impacts of bias. This represents a practical and realistic approach, considering what is currently known about how cognitive bias works.

Issues Surrounding Cognitive Bias

Thus, there are certainly debiasing strategies that teachers interested in this area can employ to take action to mitigate important negative impacts of cognitive bias on their critical thinking tasks and general student thinking. Teachers can identify important negative effects of groups of biases and then incorporate appropriate and regular environmental interventions that will work to reduce any emerging bias. However, at the moment the research into cognitive bias and its effects on critical thinking is still quite undeveloped and there is a considerable amount that is not understood about the full role, or roles, cognitive biases play in thinking processes. For example, the negative impacts of cognitive bias have received considerable attention and there are many studies and illustrations of how biases work to cause systematically irrational thinking and poor judgment and decision-making outcomes. On the other hand, in the past 15 to 20 years with the emergence of different perspectives across fields of research, the assisting

and constructive role of biases in thinking has been gaining attention (see for example, Rollwage & Fleming, 2021). More is being discovered about in what way cognitive biases may also play a constructive role in thinking and how they may work together holistically to provide thinking benefits. However, at the moment there is not enough understanding of these areas to be able to apply the research to classrooms.

The Future of Critical Thinking

Although there is a general belief amongst teachers of the benefits of critical thinking and considerable attention is being paid to critical thinking in educational frameworks, the research itself suggests a mixed picture of the actual success of critical thinking teaching in the classroom (Corriera, 2016; Pasquinelli, Farina, Bedel & Casati, 2021). One reason for this may have been the still limited understanding of, and empirical data on, the human mind's structural design and natural limits, the influences and interplay of conscious and unconscious thinking processes, and the effect of these factors on thinking and decision-making processes and outcomes. In recent years, there has been significant progress in the understanding of the human mind's cognitive processes as work from various fields including economics, general psychology, cognitive psychology, and neuroscience, along with rapid advances in technology have significantly contributed to developing a better understanding of the area.

One way to look at improving critical thinking is to look at desired outcomes and then design strategies or teaching approaches that lead closer to these outcomes. In a very broad sense, this can be said to have been the general approach behind critical thinking philosophy. However, claiming to improve critical thinking without adding a better understanding of how the mind actually works seems to be missing an important part of the picture. For example, it is now understood that many cognitive biases often operate more or less at an unconscious level and that to improve critical thinking, frameworks need to be in place that do not completely depend on a directing of conscious attention and reaction. Some outcomes may just not be possible due to the way the brain works and the inbuilt constraints and limits of the human brain. As the psychological/

neurological perspective in which a greater understanding of how the human mind functions and develops is integrated into critical thinking, it will become more possible to further identify what the mind can do, and what it cannot. From this practical starting point, we can then look at both the capabilities and the limitations of the human mind for considering what critical thinking strategies and interventions will be more successful and effective in classrooms.

This represents a very exciting future as the development of critical thinking frameworks that feature greater integration of this psychological/neurological perspective and expanded empirical research supporting this emerge. In classrooms, teachers can then expect to be more able to select tasks and accompanying interventions and frameworks that have a higher probability of success in facilitating student critical thinking work and leading to improved student critical thinking skills and dispositions.

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