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Belief-Consistent Information Processing or Coherence-Based Reasoning: Integrating Two Parsimonious Frameworks for Biases

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ABSTRACT

Recently, two independently published papers put forward separate frameworks to explain several different biases. Although the two frameworks do not contradict each other, their mere co-existence is an unsatisfactory state as psychological theory is not advanced. In the present outlook paper, we make a first attempt in bringing the two frameworks together – and with it, the largely unconnected research strands they come from. Specifically, we focus on the (bi-)directionality of a coherence generating process underlying the core of the one framework – coherence-based reasoning (CBR) – and argue that one direction is largely consistent with the core process of the other framework: belief-consistent information processing (BCIP). We elaborate on the circumstances under which coherence will be more likely obtained via BCIP. In doing so, we derive some predictions that future research could test. Furthermore, we point to relevant open questions and outline several recommendations for future research.

1 | Introduction

Psychological research has identified many biases in human information processing. Recently, two frameworks independently proposed common mechanisms behind different such biases (Oeberst and Imhoff 2023; Simon and Read 2023). In a nutshell, Oeberst and Imhoff (2023) identified 'belief-consistent information processing' (BCIP) as a common principle and underlying mechanism for a set of 17 biases (e.g., false consensus, fundamental attribution error, ingroup bias, outcome bias). Simon and Read (2023), on the other hand, proposed 'coherence-based reasoning' (CBR) as the core principle underlying a variety of different biases (e.g., confirmation bias, halo effect, ingroup bias, outcome bias).

The CBR-framework briefly referred to the BCIP-framework and concluded that the two frameworks may 'coexist comfortably with each other' (Simon and Read 2023, 444). We agree that the two are quite compatible with one another. For the field, however, the co-existence of different – but similar – theoretical models without explicating their overlap and differences is an unsatisfactory state, as a jangle fallacy may be present if (merely) different labels are used for the same or at least very similar constructs. Therefore, within this outlook article, we take a first step in bringing the two frameworks together by focusing on one aspect – the direction of information processing the two accounts proposed – and by elaborating on the circumstances under which either of them is more likely obtained.

2 | A Common Core and Perfect Compatibility

Both papers contain extensive elaborations, and their reception might be a necessary precondition for comprehending this comment and is highly recommended. Essentially, however, Oeberst and Imhoff (2023) proposed six fundamental beliefs that people hold *by default* for themselves, but not for others (e.g., 'I make correct assessments of the world'), and argued that these lead – via BCIP – to various biases. As BCIP denotes confirmation bias, they essentially propose the 17 biases to be variants of confirmation bias. Simon and Read (2023), on the other hand, postulated that individuals' information processing and interpretation aim at maximising coherence among the processed set of information. As Simon and Read (2023, 13) conceptualise coherence as independent of normative information processing (i.t.o. 'appropriate reasoning', see Simon and Read 2023, 3f), the striving for coherence may result in biases – particularly, if coherence is maximised around attractors such as strongly activated beliefs, emotional states or motivated goals.

Both accounts share a common core, as they both assume 'consistency' or 'coherence' to be a fundamental principle of cognition (note that Simon and Read 2023, 4, even treat the two synonymously). However, the frameworks differ – among other things – in the directionality of how consistency/coherence is achieved: As already suggested by its name, the BCIP-framework focuses on how beliefs guide information processing in a *unidirectional* manner (e.g., preferential search and attention for information that is consistent with prior beliefs; biased assimilation of novel information; overweighting of belief-consistent vs. belief-inconsistent information; selective retrieval of belief-consistent information).[1] The CBR-framework, on the other hand, allows for *bidirectional* ways of coherence construction (see also Holyoak and Simon 1999). For instance, according to the CBR-framework, coherence between prior beliefs and novel information may result from a coherence shift in the novel information towards the prior belief (e.g., by discrediting contradictory information). However, coherence may also result from shifting prior beliefs towards the novel information (e.g., an initial suspicion is updated by novel information). Finally, a combination of these two forms of coherence shifts may occur.

In principle, the postulated information processes (BCIP, CBR) of both accounts seem perfectly compatible with one another as neither precludes the other (see also Simon and Read 2023, 444): On the one hand, BCIP does not logically preclude bidirectional coherence shifts (e.g., novel, inconsistent information affecting prior beliefs). That is, even in the presence of BCIP-effects, prior beliefs could be affected by novel information (e.g., inconsistent evidence is selectively underweighted but still affects confidence into the prior belief). It is often simply the case that this second part is not examined in research on BCIP – and, therefore, such coherence shifts are not documented. Thus, it could already be a recommendation for future (BCIP-related) research to not only assess information processing as a function of prior beliefs but also the effects of this information processing on prior beliefs.

On the other hand, Simon and Read deliberately consider the case of 'strong and unequivocally held propositions', which 'are less likely to be altered or dislodged by structural forces' (2024, p.426). The fundamental default beliefs that Oeberst and Imhoff (2023) proposed, likely fall into this category, and, consequently, might explain, why these might predominantly guide information processing (in terms of BCIP). Consequently, BCIP could be regarded as a special case of CBR with regard to its directionality. One crucial question, then, is, under which circumstances, BCIP is the predominant way of achieving coherence. A closer inspection of the two frameworks seems to point to at least two relevant aspects.

3 | Strong/Self-Relevant/Confident Prior Beliefs

As already mentioned above, Simon and Read (2023) regard strong prior beliefs as 'less likely to be altered or dislodged by structural forces' (p. 426). Furthermore, they treated participants' attitudes as 'special nodes' that affected other nodes more than they were affected by other nodes (see Simon and Read 2023, Figure 5). And although Oeberst and Imhoff (2023) do not elaborate on potential effects of information processing on prior beliefs, they clearly expect the fundamental beliefs to affect information processing. Note that Oeberst and Imhoff (2023) labelled the proposed default beliefs in their account as 'fundamental' as they argued that people would develop them across myriad experiences in their lives – so that these beliefs were, thus, rather strongly held. Consequently, one could conclude that both accounts agree on the fact that strong prior beliefs lead to BCIP-effects. Thus, one could hypothesise strength of prior belief to be positively correlated to BCIP: the stronger the prior belief, the stronger the BCIP-effects.

Some previous research seems to support this notion (e.g., Vedejová and Čavojová 2022, regarding the biased evaluation of novel information; see also Hart et al. 2009, regarding the selection of information). A deeper look into the literature reveals, however, that researchers operate with slightly different concepts. In a study by McHoskey (1995), for instance, it was the extremity of a prior belief that mattered regarding subsequent BCIP-effects, whereas a study by Kaanders et al. (2022) found an effect of confidence in a prior belief on BCIP. Furthermore, the meta-analysis by Hart et al. (2009) distinguished between 'commitment', 'value relevance' and 'confidence' regarding beliefs and even found differential effects on BCIP for the three concepts. Consequently, we would urge future research to systematically examine and compare the different conceptualisations and operationalisations. Do confidently held estimates of point clouds (Kaanders et al. 2022) elicit similar BCIP-effects as personally relevant beliefs one has already invested a lot in (e.g., religious beliefs, Festinger et al. 1956/2011)? Since this question remains unclear, we will return for the sake of simplicity to the label of 'strong beliefs' for the following elaborations. Should future research find BCIP-effects to be independent of the strength of prior belief, this would argue against the stated hypothesis. Furthermore, a systematic examination of how much strength it requires for uni-directional BCIP to outweigh bi-directional CBR could be worthwhile.

As a corollary, one would expect strong previously held beliefs to be less affected (i.e., changed) by the confrontation with contradictory novel evidence – not only because these prior

beliefs are strong (and likely rather self-relevant) but also *because* strong prior beliefs elicit BCIP-effects – and, thereby, reduce the chance of information processing to affect the prior belief. As an illustration, consider the observation by Festinger et al. 1956/2011) that members of a doomsday cult were able to reinterpret the discrediting fact that the end of the world did not arrive on the predicted day in line with their prior beliefs (see also Hardyck and Braden 1972). Consequently, we hypothesise the strength of the relevant prior belief to negatively predict change in this prior belief. That is, the stronger the prior belief, the fewer the effects of information processing on the beliefs, or the smaller the differences between posterior and prior belief.

Taken together, coherence shifts are expected to be less bidirectional – or not bidirectional at all – in cases of strong prior beliefs. Instead, a unidirectional influence of the strong prior belief on information processing is expected (i.e., BCIP) so that coherence is accomplished by a shift in the (novel) information (e.g., ambiguous information is interpreted as consistent with one's prior belief or inconsistent information is discredited). Thus, life-long developed default beliefs such as 'I make correct assessments' (Oeberst and Imhoff 2023) should not be affected much by some novel information (e.g., information challenging the person's political conviction) but should, instead, affect the processing of the novel information (e.g., Lord et al. 1979; Sigelman and Sigelman 1984).

One could argue that the notion of stronger prior beliefs leading to more BCIP is also reflected in research on information processing prior to and after decision-making: Having decided comes along with more commitment to the chosen option (compared to prior to the decision), which should translate into stronger beliefs into the chosen option. Applying the logic outlined above, one would, thus, expect post-decisional information processing to be distorted into the direction of the decision because of BCIP. In fact, this is what previous research has documented (e.g., Fischer and Greitemeyer 2010; for an overview, see Frey 1986). More specifically, post-decision information processing is more biased than pre-decision information processing (see also Carlson and Guha 2011; Festinger 1957). Hence, we would argue that research from pre- versus post-decisional information processing supports the hypothesis that stronger beliefs lead to more BCIP.

4 | Situationally Induced Beliefs

Note, however, that unidirectional coherence shifts in terms of BCIP are not limited to strong prior beliefs. Situationally induced beliefs such as in the study by Snyder and Swann (1978), where participants were asked to find out whether their counterpart was introvert versus extravert, may likewise lead to BCIP (Oeberst and Imhoff 2023). In this case, participants do not have a strong belief about their counterpart (being introvert vs. extravert), and they do not have any stakes in the outcome as this outcome does not have any relevant consequences for participants. Subjects have been merely given one of two beliefs to test within a psychological study. Consequently, it was merely the situational induction of a belief, that led to BCIP in this study (see also Crocker 1982). However, this situationally induced belief likely did not interfere with any other previously held beliefs by participants. If experimenters had asked participants to test a hypothesis that *opposed* their prior, likely chronically activated and stronger beliefs, one would *not* have expected that participants show information processing consistent with the situationally induced belief. In other words, merely situationally induced beliefs (that are irrelevant to participants' lives) may also induce BCIP, but this should only be the case if the situationally induced beliefs do not counter any beliefs previously held by participants.

Also, it should be noted that BCIP in the studies by Snyder and Swann (1978) and Crocker (1982) was limited to information search – documenting positive testing (i.e., the predominant search for information that is consistent with one's prior beliefs). Another study by Engel and Glöckner (2013), however, demonstrated BCIP-effects because of situationally induced beliefs in a more complex scenario: Participants were asked to assume either the role of a defence counsel or a prosecutor, which led them to process and interpret the same information in support of their role-induced belief and eventually increased the probability of a verdict in line with their role. In particular, participants downplayed the importance of conflicting evidence. Consequently, the situationally induced beliefs were strong enough to show BCIP-effects in an information ecology with mixed evidence. There is likely a limit to the effects of such situationally induced beliefs: If, participants would have been presented immediately – and possibly solely – with strong and unequivocal evidence that was contrary to their situationally induced beliefs, we would not expect them to show BCIP-effects. Rather, we would expect this strong evidence to affect participants' beliefs. In other words, obtaining BCIP-effects in the context of situationally induced beliefs seems to be limited to certain boundary conditions as both, competing other previously held beliefs as well as strong and clear-cut counterevidence should eliminate information processing that is consistent with the situationally induced belief. Put differently, a situationally induced belief should only elicit BCIP-effects if (1) it does not compete with any other previously held beliefs, and (2) it does not face clear-cut contrary evidence. Again, we are not aware of any research testing these specific predictions. Note, however, that a study by Hall et al. (2012) confronted participants allegedly with their own responses to political topics, which were contrary to what they had actually responded. Participants then explained and justified their 'reversed opinions'. If one took this manipulated belief as a situationally induced belief, it should, thus, compete with the actual, previously held belief – but still, the situationally induced belief elicited BCIP-effects (in terms of explaining and justifying the situationally induced belief). This challenges our reasoning outlined above. It is conceivable, however, that this study is a special case. After all, participants were tricked into this situation and had to make sense of it and possibly tried to present themselves not as completely lost or inattentive (which could have subjectively explained why they had responded to the questionnaire exactly the wrong way around). And considering that the study itself was likely neither relevant nor consequential for participants, they might have decided to simply go with the contrary position. Therefore, more systematic tests of the above-stated hypothesis are still needed. Should future research fail to find BCIP-effects under these conditions or finding BCIP-effects regardless of these boundary conditions would argue against the present hypotheses.

5 | Conclusion and Outlook

In sum, the present paper agreed that the two recently published parsimonious frameworks for biases by Oeberst and Imhoff (2023) and Simon and Read (2023) are, in principle, compatible with one another. More importantly, however, we took a first step to specify the conditions under which BCIP – as a special case of CBR – is more or less likely. Without claiming the list to be exhaustive, we have proposed two aspects that make unidirectional coherence shifts in terms of BCIP-effects more likely than bidirectional coherence shifts: (1) strongly held prior beliefs and (2) situationally induced prior beliefs that are not countered by any other previously held beliefs or by clear-cut contradictory information. In these instances, we would expect information processing to be systematically distorted towards the prior belief and the decision.

Beyond this, we would like to put forward some recommendations for future research: As we have already outlined above, future BCIP research might want to include measures for belief change in addition to measures of BCIP. This would allow for cumulative insights into the specific forms of coherence shift (unidirectional vs. bidirectional) and their magnitude. To date, this aspect has been rather neglected or not sufficiently tested. Most research either focused on BCIP or on belief change. But even for strongly held beliefs one could think of instances, in which single novel information might, in fact, challenge these prior beliefs and possibly even lead to shifts in these beliefs (e.g., when children's behavior challenges one's beliefs about parenting). Second, we have pointed to the use of different conceptualisations and operationalisations for certain characteristics of beliefs (e.g., strong/extreme/confidently held prior beliefs). Future research would benefit from a systematic theoretical elaboration and empirical examination of these different aspects.

Another – rather general – recommendation is to increase the exchange between the two largely independent strands of research. This might not only foster the consideration of relevant insights but might also inspire novel approaches and methods. In the line of CBR research, for instance, theorising is much more formalised (e.g., Glöckner et al. 2014; Jekel et al. 2018) than typically found in research on BCIP (and confirmation bias). Formalising BCIP predictions could, therefore, further help to compare and potentially integrate both accounts.

Finally, this outlook paper has focused on the overlapping part of the two frameworks. There are, however, differences between the two frameworks that go beyond our elaborations here. For instance, both frameworks cover a different – even though overlapping – set of biases. A deeper elaboration on this issue might be worthwhile – possibly leading to an even more parsimonious framework of biases than already suggested by Oeberst and Imhoff (2023) and Simon and Read (2023).

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

No data has been collected for this paper.

Endnotes

[1] Note, however, that Oeberst and Imhoff (2023) work with a very broad conceptualisation of beliefs. Specifically, they consider beliefs 'as hypotheses about some aspect of the world that come along with the notion of accuracy – either because people examine beliefs' truth status or because they already have an opinion about the accuracy of beliefs' (1466). Accordingly, they emphasise that beliefs may be true or false, may result from any amount of deliberation, may be held with any amount of certainty and may vary in their testability. Therefore, several phenomena, that are often treated as different entities (also in the case of Simon and Read 2023), are subsumed under this conceptualisation (e.g., attitudes, stereotypes, context information, experimentally induced hypotheses). Consequently, BCIP is likewise conceptualised in this broader sense.

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