What they say is all I need: The role of narratives in confirmation bias

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Social scientists have long known about the malleability of attitudes to persuasive communications. But what happens when changed attitudes transform into change-resilient beliefs? This review explores how confirmation bias, the tendency to search for, interpret, favour, and recall information in a way that confirms one's pre-existing beliefs can be caused and reinforced by narratives–termed here as narrative-driven confirmation bias. Narrative-driven confirmation bias is ubiquitous and its implications for individual and group behaviour are serious; from its political use in garnering support and silencing alternative views to its influence on how healthcare providers diagnose their patients, this cognitive bias has the power to shape societies and change lives. Peer-reviewed journal articles on attitudes, persuasion, and biases were reviewed to create a model of narrative-driven confirmation bias and explore its underlying mechanisms and potential consequences. Current gaps in the literature are identified, and recommendations for future experimental research are provided.

Introduction

Confirmation bias is the tendency to search for, interpret, favour, and recall information in a way that confirms one's pre-existing beliefs (Nickerson, 1998). The phenomenon of confirmation bias has been observed throughout history (e.g. Bacon, 1620; Khaldun, 1958; Schopenhauer, 1844; Tolstoy, 1899), although the term was not coined until 1960 (Wason, 1960). Since then, a great deal of psychological research has been conducted documenting both the ubiquity and effects of confirmation bias (reviewed in Nickerson, 1998).

Despite widespread documentation, there is much less attention on the diatheses and mechanisms that lead people to engage in confirmation bias. A number of explanations have been provided for why confirmation bias occurs (reviewed in Nickerson, 1998), but–to our awareness–these explanations have rarely been tested as hypotheses. In many cases, confirmation bias is treated as an afterthought to explain why a certain result was obtained (e.g. McAuliff & Arter, 2016) rather than as a dependent variable to be directly measured. In the cases where confirmation bias is directly measured, it is often only one aspect of confirmation bias (e.g. information seeking) that is measured rather than the entire constellation of behaviours that make up confirmation bias. While this is valuable for the systematic study of confirmation bias, it makes comparisons between studies difficult due to the sparse literature on the diatheses and mechanisms that lead to confirmation bias.

In the interest of reducing this research gap, this review explores narratives as a mechanism that can cause and/or reinforce confirmation bias. Because communication is one of the main modalities we learn information through (Pilditch & Custers, 2018), we believe that exploring how different methods of information delivery (e.g. narratives) can influence cognitive and behavioural biases is an important endeavour for psychologists interested in learning, teaching, persuasion, and/or attitudes. Termed here as narrative-driven confirmation bias, this project will provide a review of the research to date that has examined the relationship between narratives and confirmation bias. Based on this review, we will discuss the current state of the literature and conclude with recommendations for future experimental research on narrative-driven confirmation bias.

Methods

Journal articles were retrieved using keyword searches of electronic databases. The two primary search terms "story bias+confirmation bias" and "narrative bias+confirmation bias" were applied to a collection of electronic databases in the UFV library. The remaining, more specific, keyword searches were done on PsychInfo and Google Scholar. To be included in this literature review, articles had come from peer-reviewed journals, be experimental in nature, and, thus, have a relevant comparison or control group. In addition, the experimental procedure needed to include the delivery of information to participants, and a measure of confirmation bias as a dependent variable. Studies were excluded from this literature review if they failed to measure confirmation bias as a dependent variable, the communication of information was reciprocal, or if they had a purely correlational design. A total of 30 articles relating to narrative-driven confirmation bias were found; after applying the aforementioned inclusion and exclusion criteria, 13 articles remained in this literature review. Studies were reviewed for whether narratives created or reinforced confirmation bias, what feature of confirmation bias was measured (e.g. interpret or favour), what mechanisms could influence the effect of narratives on confirmation bias, and whether these mechanisms were internally or externally driven.

Figure 1. A model of narrative-driven confirmation bias

Findings & Discussion

Of the 13 articles that met the inclusion and exclusion criteria for this literature review, nine studies (69%) examined how narratives could create confirmation bias and four studies (31%) looked at how narratives could reinforce confirmation bias–each of these studies had at least one finding that supported the mechanism of narrative-driven confirmation bias. Concerning the features of confirmation bias studied in these 13 articles, nine (69%) measured how participants searched for information, six (46%) measured how participants interpreted information, and three (23%) measured how participants favoured information. None of the articles included in this literature review measured how participants recalled information.

"If a lie is only printed often enough, it becomes a quasi-truth, and if such a truth is repeated often enough, it becomes an article of belief, a dogma, and men will die for it."

– Isa Blagden, 1869

Evidence of narrative-driven confirmation bias was found in each of the included studies. This gives preliminary evidence to our proposition that narratives can create or reinforce confirmation bias. Furthermore, this finding was seen across a broad range of population types (children, adults, university students, police officers, detectives, doctors, and experts), speaking to its ubiquity.

With that said, narrative-driven confirmation was not universal across conditions--in each of the included studies narrative-driven confirmation bias was only created or reinforced under certain conditions, which may be explained by the characteristics and frequency of the narratives presented. In general, narratives with negatively valenced information affected confirmation bias more strongly than narratives with neutrally, ambiguously, or positively, valenced information. This finding could be explained by participants giving more weight to negative information (i.e. negativity bias; Rozin & Royzman, 2001), likely due to risk or loss aversion (Kahneman & Tversky, 1979). In this way, narrative-driven confirmation bias could have been an ecologically rational decision-making strategy by participants when the costs of making a false negative decision outweighed the potential benefits of being accurate (Nickerson, 1998). Jonas and colleagues (2001) tested the effects of sequential presentation of information on narrative-driven confirmation bias and found that confirmation bias significantly increased when information was presented sequentially as opposed to simultaneously. Lynch and colleagues (2008) tested the effects of multiple exposure of a message on narrative-driven confirmation bias and found that confirmation bias significantly increased with multiple exposures.

Additionally, each of the included studies found individual differences in the degree to which participants engaged in confirmation bias. Based on our literature review, we believe that the most substantial factor that could lead to individual differences in confirmation bias is the time individuals take to formulate a hypothesis about the information they are being presented. Specifically, a premature formulation of a hypothesis seems to lead to a greater confirmation bias (Hatala et al., 1999; Hill et al., 2008; Koppelaar et al., 1997; Masnick & Zimmerman, 2009; Nurek et al., 2014). We have identified several moderators internal to the receiver that we believe to influence the time at which an individual formulates a hypothesis (See Figure 1).

Recommendations

While this review provides preliminary support for the role narratives can play in creating or reinforcing confirmation bias, it should be noted that this finding is based on a very small and sparse pool of research. Further research is needed to determine both the validity of narrative-driven confirmation bias, as well as the factors that moderate it if it is found to exist. With this in mind, we have several recommendations for future researchers interested in this area:

- Developing a complete, validated measure of confirmation bias (one that considers the tendency to search for, interpret, favour, and recall information in a way that confirms one's pre-existing beliefs) would allow for greater comparisons across studies

- In the meantime, while researchers must use incomplete or indirect measures of confirmation bias, explicitly linking and explaining the theoretical rationale of these measures–as well as explicitly identifying what aspect of confirmation bias is being studied–would also allow for greater comparisons across studies

- Systematically identify and study the mechanisms that create/reinforce confirmation bias –this would allow a greater understanding of the circumstances narrative-driven confirmation bias is likely to occur under, as well as give insight into potential interventions

- Though not looked at in this review, examining the influence of narratives in group settings on confirmation bias (e.g. echo chambers) would be pertinent in our increasingly polarized political climates

- Conducting research with procedures that are more ecologically valid (e.g. cognitively busyness manipulations, type of instruction manipulation, etc.) would allow for greater external validity
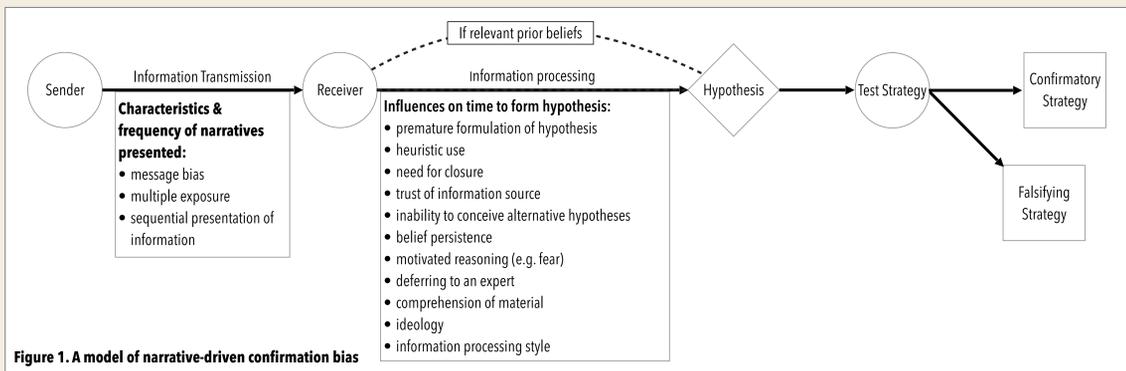
Table 1. Abbreviated findings of literature review

Author (Date)	Substantive foci	Measure used	Results
Hatala, Norman, & Brooks, 1999	The role of narrative-driven confirmation bias (NDCB) on ECG diagnosis	ECG diagnosis; ECG features listed that supported their diagnosis	ECG diagnosis accuracy was highest when clinical history was consistent with correct diagnosis, lowest when clinical history suggested an alternative diagnosis, and in the middle when receiving no information [F (2,51) = 24.48, p < .001]. Receiving an alternative diagnosis resulted in more listed features matching alternative diagnosis [F (2,51) = 24.01, p < .001] and listed incorrect diagnoses [F (2,51) = 3.37, p=.04).
Hill, Memon, & McGeorge, 2008	The role of NDCB in interviews with mock suspects	Type of suspect interview questions generated; rating of suspect's guilt and confidence in that rating	Participants in the guilty expectation condition (GEC) rated the suspect as significantly more guilty than those in the innocent expectation condition (IEC) [t(38) = 9.57, p<0.001]. ii) Participants' confidence in their ratings of guilt/innocence was significantly higher for those in the GEC than those in the IEC [t(28.95)= 2.47, p=0.02]. iii) Participants in the GEC formulated a significantly higher proportion of guilt-presumptive questions to ask the suspects than those in the IEC [t(28.04)=1.95, p=0.031 (one-tailed)]. iv) Participants in the GEC formulated questions that were given significantly higher ratings for guilt-presumptiveness than those in the IEC [t(24.45)=2.30, p=0.03].
Koppelaar, Lange, & van de Velde1997	The role of NDCB in rape victim credibility assessments	Number and types of questions asked; attributed victim and assailant responsibility	**Study 1 (law students): Number of questions:** the number of questions varied significantly with victim credibility information [F(2, 83) =3.26, p < .05]. Subjects in the negative victim credibility condition asked most questions (M = 39.8), followed by subjects in the control condition (M = 31.7) and the positive victim credibility condition (M = 31.3). **Type of questions:** the distribution of questions by type was significantly associated with prior victim credibility information [X **Study 2 (police): Number of questions:** found [F(1, 22) =.06, ns]. **Attributed assailant responsibility:** no significant main effects for victim credibility information [F(2, 21) =.82, ns].
Kukucka & Kassin, 2014	The role of NDCB on the evaluation of forensic evidence	Similarity ratings, match judgements, and guilt judgements	**Similarity ratings:** participants rated the same handwriting samples as more similar when paired with a confession than when presented without context in Study 2 [t(41) = 2.66, p = .011, d=0.58], however this result was not found in Study 1 [t(167) = 1.73, p = .085]. **Match judgments:** participants in the Confession-Present condition judged the samples as a match significantly more often than those in the Confession-Absent condition in Study 1 [(26.74% vs. 10.84%, respectively), significantly higher scores than those in the Confession-Absent condition in Study 1 [F(1, 165) = 11.43, p= .001, d = 0.52]. Participants in the Confession-Present condition were far more likely to judge the defendant as guilty than those in the Confession-Absent condition [(42.86% vs. 4.76%, respectively), χ2(1)=16.80, p = .0001].
Masnick & Zimmerman, 2009	The role of NDCB when evaluating reports of social science research	Participant's judgements of methodology	**Judgments about methodology:** < .001, partial η2 =0.13].
Muris et al., 2009	The role of NDCB in inducing fear-related reasoning biases	A modified version of the Wason Selection Task (WST); the Search for Additional Information Scale (SAIS)	**WST:** when receiving a danger rule about the unknown animal participants used a confirmatory strategy [F(3,307) = 35.85, p<.001, partial η2 = 0.26] and a falsifying strategy when receiving a safety rule [F(3,307) = 27.45, p<.001, partial η2 = 0.21]. **SAIS:** participants who received negative information searched for significantly more threat information, followed by participants who received ambiguous information, followed by those who positive information [F(3, 309) = 10.80, p < 0.001, partial η2= 0.10].
Muris, Huijding, Mayer, van As, & van Alem, 2011	Comparison of interventions to reduce fear-related reasoning induced by NDCB	The Search for Additional Information Scale (SAIS)	Both positive information and imagery were more effective in reducing fear related reasoning induced by NDCB [F(2,68) = 15.15, p < .001, partial η2 = 0.31]
Nurek, Kostopoulou, & Hagmayer, 2014	The role of NDCB in medical diagnoses	Measure of diagnostic bias	Confirmation bias did not strengthen a leading diagnosis [t(95) = 1.50, p = 0.14], but did weaken a trailing diagnosis [t(95) = 7.17, p <0.01, d = 0.73]. These results were replicated in Study 2 (respectively t(84) = 1.30, p = 0.20 and t(84) = 7.03, p <0.01, d = 0.77). These results were also found when using personalized (as opposed to mean-based) comparisons (respectively t(84) = 0.69, p = 0.49 and t(84) = 7.17, p <0.01, d = 0.77).
Remmerswaal, Huijding, Bouwmeester, & Brouwer, 2014	The reciprocal relationship between NDCB and fear	The Information Search Task (IST); the Visual Analogue Scales (VAS); the Fear Beliefs Questionnaire (FBQ)	Participants in the threatening information group asked more negative questions on the IST, followed by the ambiguous group, followed by the positive group [F(2,164) = 5.93, p < .01, partial η2 = .07]. The higher participant's fear scores, the more negative questions they asked at a later time point [r = .11], which in-turn predicted the amount of negative questions posed at a later point-in-time [r = .14]. The amount of negative questions significantly predicted post-test fear belief scores [b = .56, p < .05]. Furthermore, previous fear belief scores also significantly predicted post-test fear belief scores [b = .75, p < .001], indicating a reciprocal relationship between confirmation bias and fear.
Lynch, Bevan, Achter, Harris, & Condit, 2008	The effect of multiple exposures to multiple messages on NDCB	The genetically based racial discrimination scale	Multiple exposures to messages about genetics significantly increased genetically based discrimination [t(90) = –3.30, p < 0.001), d=0.248]
Jonas, Schulz-Hardt, Frey, & Thelen, 2001	The role of sequential information search in reinforcing NDCB	The mean difference between the number of chosen supporting and conflicting articles	On average, participants chose more decision-supporting than decision-conflicting articles in both the simultaneous and sequential information search conditions [F(1, 34) = 16.91, p < .001]. The most important finding, however, was that, as indicated by a significant interaction of information search mode and type of information [F(1, 34) = 4.23, p < .05], confirmation bias was significantly stronger in the sequential condition than in the simultaneous condition.
Westerwick, Johnson, & Knoblock-Westerwick 2017	The role of source vs. content cues on NDCB	Article selection and time spent reading each of the articles; The cognitive reflection (CR) test; Need for cognition (NFC) sub-scale of REI-10	**Selection of attitude-consistent vs. -discrepant messages, slanted vs. unbiased sources:** Participants selected attitude-consistent messages more, compared to attitude-discrepant messages [F(1, 119) = 26.06, p < .001, partial η2 = .180]. An interaction between attitude-consistency and CR, [F(1, 117) = 5.53, p = .020, partial η2 = .045] further evidenced confirmation bias. Source cues affected selective exposure, evidencing narrative-driven confirmation bias [F(1, 117) = 10.99, p = .001, partial η2 = .086]. NFC affected selective exposure to messages from slanted vs. unbiased sources, such that correlations showed that individuals high in NFC selected fewer messages from slanted sources [F(1, 117)=10.06, p=.002, partial η2 = .079]. **Exposure to attitude-consistent vs. -discrepant content and slanted vs. unbiased sources:** Participants spent more time on messages with attitude-consistent content cues compared to messages with attitude-discrepant content cues, evidencing narrative-driven confirmation bias [F(1, 119) = 22.85, p < .001, partial η2 = .161]. CR and NFC were not found to influence overall confirmation bias (p=.167). Participants, in general, spent more time with unbiased source messages than slanted-source messages, demonstrating sources affected selective exposure [F(1, 116) = 3.88, p = .052, partial η2 = .032]. The higher the NFC, the less time was spent with slanted sources [F(1, 116) = 8.77, p = .004, partial η2 = .07]. The higher NFC, the more time was spent viewing attitude-consistent content, and less time viewing attitude-discrepant content, demonstrating the effect of NFC on the confirmation bias [F(1, 116)=4.13, p=.044, partial η2 = .034].
Yeo, Xenos, Brossard, & Scheufele, 2015	The role of ideology on NDCB	Selection of media channel (ideological selectivity)	Based on a logistic regression analysis, there was a significant, positive relationship between ideology and the selection rate of Fox News relative to CBC (B = .58, Se = .12, p ≤ .001) and a significant, negative relationship when predicting the selection rate of MSNBC relative to Fox News (B = – .45, Se = .10, p ≤ .001). Additionally, interactions between political ideology and exposure to ideological cues only had a positive, significant effect when comparing selection rates of MSNBC and Fox News. "Among those who received obvious and consistent ideological cues, there [was] relatively little difference in the selection rate of MSNBC by liberals and conservatives. However, among those who received no cues, liberals were more likely to select MSNBC and CBC relative to Fox News, while conservatives were more likely to select Fox News over the other two channels. As we move along the ideology spectrum from liberal to conservative, the selection rate of fox News increases while that of MSNBC declines. When clear cues are present, both liberals and conservatives were more likely to opt for countervailing channels, compared to when cues are ambiguous. This may indicate that people use ideological cues to guide their judgments of issues they know little about. When they know where their side stands on a particular issue, they seek a broader range of information" (p. 181-182).