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I'm the same, I'm the same, I'm trying to change: Investigating the role of human information behavior in view change

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Abstract

Information is powerful; it can influence peoples' views and, in turn, their behavior. Much recent research and discussion on the role information plays in view change has focused on filter bubbles, echo chambers and misinformation and how they might influence what people think and how they act. However, no prior work has focused specifically on understanding the human information behavior (HIB) that drives and facilitates view change. We report findings from interviews with 18 people who recently changed views on issues they considered important. We found a tight symbiotic relationship between HIB and view change; passive information encountering sparked change, often spurring follow-up active seeking and verification which progressed the change to a "point of no return," supported making the change and reinforced the decision to change. When shared, information that contributed to the change sometimes sparked changes in others (as did expressing or debating the change), serving as an information encounter that perpetuated a cycle of HIB and view change. This understanding of the integral role of HIB in view change can inform policy and systems design to promote view change autonomy and a broader research agenda of understanding HIB to support democratic principles and values.

1 | INTRODUCTION

Misinformation has been blamed for influencing elections, filter bubbles, and echo chambers for an explosion in uptake in COVID conspiracies and recommender algorithms for engendering extremism. In these cases, digital information has been blamed for view changes that contribute to social harm. But what role does information *actually* play in how people change their views? How do people acquire and engage with the information that influences their views? Widespread public concern about social media-based misinformation and polarization makes addressing these questions vital. While many fields have examined view change, the role of human information behavior (HIB) is underexplored. While HIB often supports view formation and change (Case & O'Connor, 2016), surprisingly little research has investigated the relationship between HIB and view change.

Decades of psychology research on view change—aimed at understanding how and why people change their

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attitudes and associated beliefs—has treated information as a mere environmental stimulus rather than something of dedicated interest (Petty & Tormala, 2003). However, information is powerful and can influence peoples' thoughts, emotions, and actions (Kuhlthau, 1991). How information can persuade has been extensively investigated in areas including marketing (Underhill, 2009), propaganda (O'Donnell & Jowett, 1992), and communications (Nwabueze & Okonkwo, 2018), including how it can nudge behavioral changes (Thaler & Sunstein, 2009).

In information science, much prior work on view change has examined the impact of persuasion *through* information rather than the role of information in view change itself. Most has focused on filter bubbles, echo chambers, and misinformation (e.g., Flaxman et al., 2016; Garrett, 2009; Rubin, 2019), highlighting their potential to limit peoples' autonomy (Helberger et al., 2018). Links have been made between personalization, misinformation, and negative social consequences: limiting people's access to ideas they disagree with may affect how informed they are in decisions around, for example, healthcare and voting (Helberger et al., 2018; Islam et al., 2020; Kang & Lou, 2022; Weeks et al., 2016).

Previous psychological research on view change centers the person who changes view, but not the role of information. In contrast, research on echo chambers, filter bubbles, and misinformation predominantly treats the person changing view as an object acted on by information, with little agency. However, humans are not uncritical consumers of information; they actively seek, triage, verify, accept, and reject it (Ellis, 1989; Kuhlthau, 1991; Marchionini, 1997). In short, people do not just "consume" information, they engage in human information behavior. This behavior includes both intentional seeking and unintentional acquisition (Case & Given, 2016, p. 200). While HIB can encompass behavior and associated thoughts and feelings (Case & Given, 2016), in this article we focus on the *actions* that people took when engaging with information in the context of view change.

Changing opinion has been identified as a possible outcome of information acquisition (Case & O'Connor, 2016). However, while previous research has hinted at a complex relationship between HIB and view change, it has not examined its nature. We investigate the role of HIB in view change with the aim of better supporting human agency in view formation and change and limiting the potentially negative effects of misinformation and algorithmic personalization.

We conducted qualitative, semi-structured interviews with 18 people who recently changed view on issues important to them, focusing on understanding their HIB—particularly when interacting with online information. We build on our previous work that described the information types and some behaviors involved in view change (Mckay, Makri, Gutierrez-Lopez, et al., 2020). This article reports a new and explanatory (rather than solely descriptive) analysis of the HIB involved in view change. Our analysis provides a detailed understanding of how and why various information behaviors contribute to view change and foregrounds a tight symbiotic relationship between HIB and view change, where HIB not only drives and view change but is also driven by it. Our findings highlight the importance of (serendipitous) information encountering in sparking and catalyzing view changes and demonstrate that a single, one-off information encounter is not sufficient to change someone's view; view change is a process that drives and is facilitated by several types of HIB in concert.

2 | BACKGROUND

As there has been extensive work on view change across many disciplines, this section discusses the critical context thematically—focusing on prior work that contributes to an understanding of the role information plays in view change. We discuss prior work on psychology and persuasion (section 2.1), on the new information order that has foregrounded concerns about views and behavior being manipulated (section 2.2) and how our research sits within the broader HIB literature (section 2.3).

2.1 | Psychology and persuasion

Early psychology research that brings together information and view change was born of post-WWII concerns about the influence of propaganda. It demonstrated messages had to be "consistent and widespread" (O'Donnell & Jowett, 1992) to be influential and focused on how people could be influenced, rather than on how they experienced view change.

Propaganda research prompted interest in "attitudinal change" in psychology (O'Donnell & Jowett, 1992), giving rise to the ABC (affective-behavioral-cognitive) model of attitudinal change (Petty & Tormala, 2003). Psychology research recognizes that social factors may affect attitudinal change, but treats information merely as a "stimulus" for change (Wood, 2000) rather than a driver warranting dedicated investigation. Instead, view change is seen as resulting from the need to resolve cognitive dissonance (mental conflict between views and actions; Festinger, 1962). Particularly pertinent is the concept of *selective exposure*—focusing on information congruent with current views to avoid or mitigate cognitive dissonance (Festinger, 1962). However, dissonance helps to explain why people might *maintain* rather than change their views; no prior work has examined how

engagement with information can resolve the dissonance associated with becoming uncomfortable with one's held view.

More recent work has focused on how informational, technological, and physical interventions might nudge people's decisions, such as buying products (Underhill, 2009), or choosing investments (Thaler & Sunstein, 2009), but has not investigated the role information plays in that decision-making. While some research advocates for ethical, transparent nudges that promote reflection on choices (rather than subconsciously manipulate action) (Hansen & Jespersen, 2013; Helberger et al., 2018), limited research has focused on the experience of the person being nudged and the role information plays in it. While the role of information in addressing false beliefs has been examined (Lewandowsky et al., 2012), it is the beliefs rather than the experience of engaging with information that this research has focused on.

2.2 | The new information order

Increased consumption of algorithmically mediated information, for example, through news or social media feeds, has led to significant concerns about the effects of so-called filter bubbles and echo chambers (Bruns, 2019; Helberger et al., 2015, 2018). A concern was that personalization algorithms might only show people similar information to what they have previously clicked on—filtering out other information and trapping them in so-called "filter bubbles." Filter bubbles, in theory at least, might restrict their exposure to diverse perspectives and, unbeknown to them, influence their views, potentially resulting in polarization (Bruns, 2019). A related concern is that personalization algorithms might coax people into echo chambers—environments where they are both surrounded by information that reinforces their existing views and shielded from information that does not (Flaxman et al., 2016). Furthermore, false information, whether shared to mislead or not, could manipulate views. Therefore filter bubbles, echo chambers, and misinformation all have the potential to shape peoples' views. Their potential to negatively impact public discourse (Helberger et al., 2015) and thus put social structures such as democracy at risk (Helberger, 2011) means they cannot be ignored. These "information structures" have also been blamed for influencing important personal decisions, such as those around political voting and vaccination (Islam et al., 2020; Weeks et al., 2016).

However, there is a growing body of evidence demonstrating that concerns about filter bubbles and echo chambers have been overstated (Dubois & Blank, 2018; Fletcher & Nielsen, 2017, 2018b); despite the hype, there is no empirical evidence of a filter bubble effect (Bruns, 2019). To the contrary, social media use *increases* rather than decreases engagement with diverse news sources (Fletcher & Nielsen, 2018b). While there *is* empirical evidence of some people opting into echo chambers, this is mostly a small minority of highly politically partisan individuals (Arguedas et al., 2022). In most cases, and especially on social media, people are incidentally exposed to a diverse range of information, preventing total insulation from others' views (Bruns, 2019; Fletcher & Nielsen, 2018a).

Although evidence of filter bubbles is lacking and echo chambers limited, polarization remains a perennial problem, which may have an alternative causal mechanism (Törnberg, 2022). In the United States, there is strong evidence of digital environments, especially social media, driving political polarization by dividing society into sharply contrasting political groups (Colleoni et al., 2014; Ledwich & Zaitsev, 2020). Political polarization can influence what information people consume (Flaxman et al., 2016) and share (Guess et al., 2019), and their willingness to engage with misinformation (Stefanone et al., 2019). There is also evidence that people prefer to consume information that reinforces rather than challenges their existing views (Garrett, 2009) and that exposure to opposing political views on social media can increase polarization (Bail et al., 2018).

Turning to misinformation, network analysis has demonstrated clear cause for concern: misinformation spreads more widely and is more persistent than fact (Del Vicario et al., 2016; Nyhan et al., 2010). Some research has examined how misinformation is assessed, with mixed results on peoples' ability to distinguish it (Colliander, 2019; Heuer & Breiter, 2018; Nyhan et al., 2010). Research on misinformation sharing has found people not only share misinformation they consider factual, but also information they *know* is false, because they agree with it, or to spark conversation (Chen et al., 2015). While this work begins to understand (mis)information behavior, it focuses specifically on misinformation rather than the broad information landscape that impacts view change.

Overall, there is clear evidence that information (especially in personalized environments) can influence peoples' views, but not necessarily through the diversity-limiting mechanisms of the filter bubble hypothesis or through the creation of impenetrable echo chambers. Despite this, the risk of manipulation through information remains very real. However, much is not yet known about how and why digital information environments influence view change. Rather than engaging in the rhetoric of these "information structures," this study takes a

fresh approach by investigating the HIB involved in changing views. This behavior takes place in the digital environments that can influence view change.

2.3 | Human information behavior

While there are several models of information seeking and encountering (e.g., Bates, 1996; Erdelez & Makri, 2020; Marchionini, 1997), in them the person engaging with information is usually an invisible actor, acting on or being acted upon by information without reflection on how it shapes their experience, views or values. Notable exceptions include Kuhlthau's ISP model (Kuhlthau, 1991), which considers the roles of affect, behavior, and cognition and Belkin's ASK, which considers the impact of social ties and pre-existing knowledge on information seeking (Belkin et al., 1982).

"Information behavior," though, is an "overarching term that includes intentional...behaviors (such as active seeking) as well as unintentional or serendipitous actions...such as encountering information" (Case & Given, 2016, p. 200). While it is now common to study HIB across domain areas, work and everyday life contexts, it is less usual to investigate its role in fundamental human experiences, such as view change. Doing so is important as, while HIB often plays a vital role in human experiences, this role only becomes visible through dedicated examination. We can note the importance of this type of research in, for example, Ruthven's (2022a) information behavior theory of life transitions, which considers how HIB shapes life changes, such as having a child and gender transition.

We investigate view change as human experience to allow for richer elucidation of the integral role of HIB in view change. Complementary previous work includes a study by Greyson and Bettinger (2022), who investigated how mothers' views on vaccines changed over time. Their participants conveyed increased vaccine hesitancy as a mixed *cognitive* and *affective* journey, where negative vaccination experiences combined with new information to support view change. Many types of personal life change, such as deciding to change religion or divorce one's partner, may also be accompanied by view change (see Ruthven, 2022b).

Our own previous work took initial steps towards understanding the role information plays in view change (Mckay, Makri, Gutierrez-Lopez, et al., 2020). In that work, we discussed the information *types* (e.g., video, text), *sources* (e.g., recommendations, social sources), and *behaviors* that contributed to view change. While we identified discrete HIBs, such as active information seeking, passive information encountering and verification, in this article we *explain* how these behaviors collectively support view change rather than merely describing them and treat these behaviors as *connected* rather than discrete.

3 | DATA COLLECTION AND ANALYSIS

We conducted semi-structured interviews with 18 people who had changed their view on an important issue to them in the previous year and where they considered information to have played an important role. Ethical approval was granted by the university's Research Ethics Committee.

As this was a difficult population to recruit from, we used a convenience sampling approach. However, to ensure a diverse participant pool and avoid the bias that recruiting solely from academic networks might engender, we recruited through a range of channels: the researchers' personal and professional networks (4 participants), student mailing lists (11), UK parenting discussion forum Mumsnet (1), and by inviting contributors to UK media columns on changed views (2). All participants confirmed they were over 18. Eleven identified as female, seven as male; we asked their gender to ensure gender balance. We did not collect additional demographic data as this was not relevant to our aim of understanding the relationship between information interaction and view change. Collecting certain demographic data (e.g., race/ethnicity, religion, political affiliation) might also have made participants feel uneasy about sharing their views. Taking an interpretivist standpoint which regarded view change as socially constructed, we did not define the term to participants. Instead, we encouraged them to discuss examples *they* considered view changes. All examples reflect a shared intuitive definition.

We provided examples of potential view changes, including eating habits, football and politics in our advertising materials, but participants both self-selected, and selected view changes to discuss. To help us prepare, we asked that they provide a one-sentence precis of their view change prior to the interview. We asked participants to avoid discussing changes they might find upsetting, or that involved illegal activity. We recognize that our recruitment approach, and our position as academics (commonly stereotyped as left-leaning) may produce some bias. However, we captured a broad range of topics (including that the earth might be flat), and six participants were from outside a university setting, giving us confidence in the generalizability of our findings. To further ensure generalizability, we continued interviews until data saturation was reached. While we only

recruited people who were reflective enough to recognize view change, and open enough to discuss it, this does not limit the importance of our findings: we make no claims as to the prevalence of view change in the general population, only its nature.

Interviews were conducted in 2019; fifteen in-person, three remote. Most lasted around an hour. All but one was conducted by two researchers, to support in-depth and varied questioning and to help fill gaps in participants' accounts. Rather than follow an interview guide, questions were specific to each interview. However, we did have a series of topics to cover in each interview: the nature of the change, how it had come about, when they became aware their view had changed, whether they had shared their views with anyone, and, crucially, the role of information in the change. For example, when P7 mentioned reading news articles about the 2017 London Bridge terrorist attack, we asked where and how she found the articles and how they influenced her view on Brexit. These topics were selected based on stories of view change in the media and on Reddit, our focus on information interaction, and our initial interview which was intended to be trial run but was so successful that we included it in our data set.

Although some participants described view changes that happened months prior to their interview, all could remember the information sources in their view change journey—usually in enough detail for us to locate them and to discuss their role in the view change.

The view changes participants discussed often had a strong impact on their lives, so we took a sensitive approach to interviewing that involved paying careful attention to participants' feelings. View change can engender feelings of discomfort or shame (Petty & Tormala, 2003), we did not want to reinforce these, and so stressed we would not judge participants for their views, previous or current. We took an "empathy-first" approach to interviewing, demonstrating interest, curiosity, and understanding, without endorsing the participants' views or expressing our own. We exercised careful judgment when deciding which of the information sources participants mentioned to access, to mitigate against potential (participant and researcher) distress, checking whether participants were likely to find re-engaging with the source upsetting. We reminded participants they could pause or stop any time, especially if they began to feel upset. At the end of each interview, we conducted separate participant and researcher debriefs, to ensure nobody was left distressed. Many participants mentioned they found it valuable to reflect on their view change experiences.

Interviews were professionally transcribed, then analyzed inductively using Thematic Analysis (Braun & Clarke, 2006, 2021), supported by Atlas.Ti. Although a single researcher led the analysis, all researchers informed it; we discussed the definition, scope and boundaries of several codes and themes. For example, we discussed the nuances between active and passive information acquisition and expressing and debating views. We did not try to identify existing HIB from the literature in our data, but to understand the relationship between HIB and view change. For example, rather than solely identify that most view changes involved a mix of active seeking and passive encountering, our analysis sought to explain the role this HIB played on view change; for example, passive encounters created awareness of the potential for change and follow-up active seeking increased recognition of the need for change.

This HIB-focused analysis forms part of a larger analysis of the role of information interaction in view change, which resulted in an overarching process model of Human Information Interaction-facilitated view change, to be presented in a future paper.

4 | FINDINGS

We now discuss our findings. We do not give specific numbers of occurrences of themes or codes, as *more instances do not necessarily mean the theme itself is more crucial* (Braun & Clarke, 2006, p. 82). We first provide an overview of the view changes participants discussed (section 4.1), then discuss participants' willingness to engage with views other than their own (section 4.2). Next, we examine HIB during view change (section 4.3), explaining their behavior and highlighting the tight symbiotic relationship between HIB and view change (section 4.4).

Note the findings discuss sensitive topics such as child abuse allegations, environmental destruction, and animal cruelty.

4.1 | Overview of view changes

Participants described several types of change, ranging from *complete change* of an existing view, to *strengthening* an existing view (e.g., P18 became even more concerned about climate change), to *clarifying* an existing view (e.g., P14 became more focused on how to advocate for a center ground in British politics—a space in the political party spectrum that is neither right nor left-leaning). Some participants also discussed *re-embracing* an already held view (e.g., P15 became vegetarian again after she had "lapsed").

Participants discussed a range of *political*, *social*, *environmental*, and *personal* issues, summarized in Table 1.

TABLE 1 Summary of the view changes our participants discussed.

P#	View change	Change type	Information sources
P1	Chose who to vote for in 2019 Indonesian election	Political	YouTube videos posted by religious leaders, online news
P2	Changed British political allegiance from Labour to LibDem	Political	Political Tweets, BBC Brexitcast podcast
P7	Changed from pro- to anti-Brexit	Political	Videos shared by colleagues on WhatsApp of racial discrimination
P9	Changed from being a British Labour supporter to supporting LibDems	Political	BBC News Website, political party websites and manifestoes, political compass website
P12	Surprised to find he occasionally agreed with Trump and an anti-EU documentary	Political	Tweets Trump posted, Aljazeera documentary *Europe's Forbidden Colony*
P14	Became more focused on how to advocate for center ground and LibDems in UK politics	Political	WhatsApp LibDem activist group, news articles, *Political Thinking* podcast
P15	Came to feel sympathy for Brexit voters	Political	Political Facebook posts, comedy Brexit video
P4	Came to believe allegations of child sexual abuse against Michael Jackson	Social	*Finding Neverland* documentary and Tweets on it
P5	Came to support marriage equality	Social	Netflix documentaries *Trembling Before G-D* and *Paris is Burning*, Facebook posts on marriage equality
P10	Decided to reduce meat consumption for predominantly animal rights reasons	Social	Melanie Joy TED talk, graphic slaughterhouse image shared on social media, BBC recipe website, dinner at a farm
P11	Changed approach to online discussions; considered social causes of youth crime	Social	Political Tweets and Facebook posts, news article about knife crime, UK/US crime data
P15	Returned to veganism after "lapsing"	Social	*Meat is Murder* videogame, *Earthlings* documentary, vegan Facebook group
P3	Became vegetarian for ecological reasons	Environmental	Netflix documentaries *Chasing Coral* and *Blue Planet*, social media posts on environmental issues, Greta Thunberg speech
P8	Gave up eating beef for environmental and animal rights reasons	Environmental	Guardian News app, *Homo Deus* book, NHS website, personal contacts
P16	Went from being concerned about climate issues to being a climate activist	Environmental	Guardian changing language from climate change to crisis, WhatsApp group and news articles on climate activism, BBC documentary *Climate Change: The Facts*
P18	After feeling personally at a loss with climate change, became so aware of climate issues he developed recycled polyester in family clothing business	Environmental	"The Wild Places" book and "Generation Anthropocene" article by Robert Macfarlane
P6	Decided to change university after accepting a place	Personal	Promotional material about mature students on social media, student demographic data, LinkedIn contact with students/alumni
P13	Decided to have surgery for osteoarthritis she had been "putting off"	Personal	Forum for runners, articles and YouTube videos of surgeries, personal account of doctor who had undergone cheilectomy
P17	Became "more willing to consider fringe beliefs" the earth might be flat and the moon landing might be faked	Personal	YouTube videos of interview with "allegedly Dave" Murphy and NASA 1965 archive footage of the first US spacewalk

4.2 | Willingness to engage with views other than their own

The dominant popular narrative of our time is of people often being unwilling to engage with views other than their own (Bruns, 2019). Our participants may not be representative of the general population; they self-selected as people who had changed view and therefore may be more willing to engage with alternative views than others.

Some participants expressed a strong desire to understand alternative viewpoints, for example P8 stated she tried to "widen" her information sources to gain "a broader perspective in something that challenges my views" to "judge myself...put myself on the spot." Some participants were wary of becoming stuck in informational "bubbles," for example, P2 who followed a range of political views on Twitter as although she knew she would not necessarily agree with them, she did not "want to be in this bubble where I only listen to people that have the same ideas that I do." P11 also described a deliberate diversification of information consumption, stating this helped open his mind, normalize (rather than polarize) his views and challenge his preconceptions; "it doesn't let someone's polarized or biased opinion seep into my consciousness." Conscious information diversification is a little-documented information behavior (see McKay et al., 2022, for a complementary study that focusing on it).

While all participants were willing to engage with alternative views, there were limits. P4 voiced his initial reluctance to hear a view that might trigger a re-evaluation, stating "the [Michael Jackson] fan in me didn't want to watch" the "Leaving Neverland" documentary, which featured testimony from three men who alleged Jackson had sexually abused them as children. P2 noted she wanted to be in control of her engagement with alternative views and would be "pretty pissed" if someone tried to force the issue. Others didn't want to engage with extreme views or information, drawing the line at "distressing" (P3, P15), "defamatory or inciting" (P12) information.

Being willing to engage with alternative views is a precondition for view change; people must engage with views other than their own to become aware of possible change. However, despite having already changed view, participants were not always willing to engage with alternative views. This depended on the topic, time available and their tolerance level. We now discuss the mainstay of the findings; the HIB that stems from this willingness and drives and facilitates view change.

4.3 | The human information behavior that supports view change

As described in our previous work (Mckay, Makri, Gutierrez-Lopez, et al., 2020), participants engaged in several previously documented information behaviors during their view changes, including active information seeking (Ellis, 1989), passive information encountering (Erdelez & Makri, 2020), verifying (Rieh & Danielson, 2007), and sharing (Talja & Hansen, 2006). What we did not discuss in our previous work is how each of these contributed to view change (i.e., how, in concert, they help facilitate view change).

While most previous HIB research has focused on active seeking, view change, particularly its early stages, was predominantly facilitated by **passive encountering**. Indeed, only two view changes were sparked by actively seeking information; the other 17 were facilitated by passive encounters. While this does not mean view change is *always* instigated through passive, rather than active acquisition, it does highlight the importance of passive encounters in changing views. **Active seeking** was found to occur later in the view change process; to support practicalities of making the change, **verify** the credibility of information used to make the change and reinforce the decision to change. After making the change, some participants reported **sharing** the information that contributed to the change and **expressing or debating** their changed view (though some also deliberately refrained), which could then potentially feed into the view changes of others (see Figure 1). This section reports each of these HIB-supported stages of view change.

4.3.1 | Passive encountering creates awareness of the potential for change

There were only two examples where **active seeking** instigated a view change by creating awareness of the potential for change. One was P13's eventual visit to the doctor to diagnose the pain in her big toe after stubbing it. She actively sought information about her toe before requesting a diagnosis. Another came from P18, who became more aware of the need to take personal action on the climate crisis while actively seeking information for his dissertation on the link between nature writing and portrayals of climate change. He found "The Wild Places" book by Robert Macfarlane, which sparked the change as it directly highlighted negative influences humans have on nature.

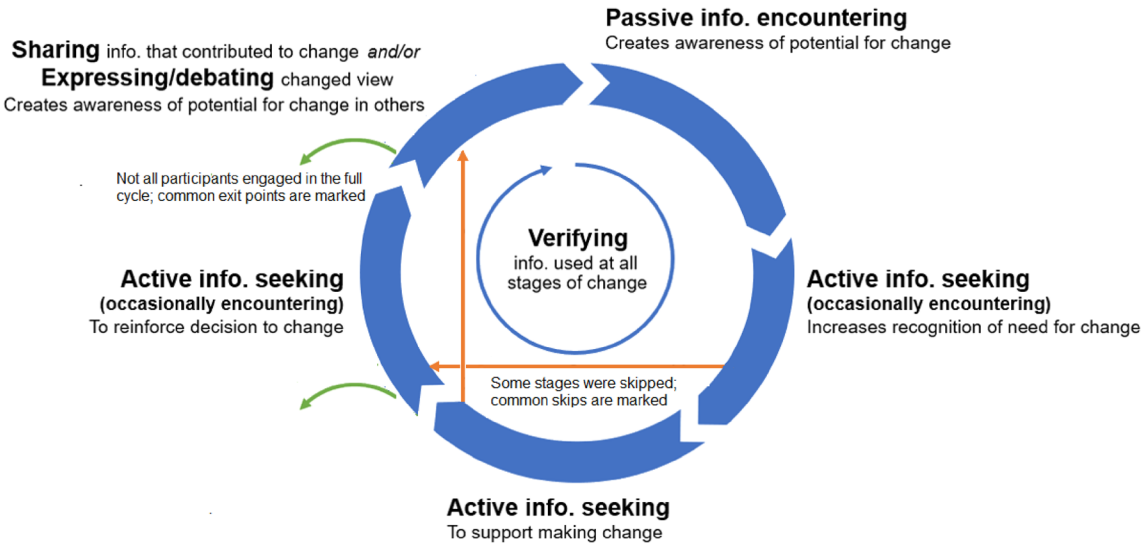

FIGURE 1 The cyclic relationship between HIB and view change, demonstrating a tight symbiosis.

Instead, awareness of the potential for change almost always came from **passively encountering** information. This was often while browsing social media feeds or news, or video recommendations on streaming platforms such as YouTube and Netflix. For example, P4 was a "big Michael Jackson fan" and encountered an article in the Metro newspaper announcing the release of the "Leaving Neverland" documentary. He "didn't have any intention" of watching it, as "the fan in me didn't want to watch..." However, "there was enough buzz on my social media feeds" expressing the testimony was credible to make him want to "judge for myself." It was encountering posts about the credibility of the documentary (rather than encountering the newspaper article about its release) that created awareness of the potential for change, towards believing Jackson's accusers.

The importance of passive information encountering has been highlighted in previous studies, which have found that people do not always actively seek information; sometimes they passively encounter it (e.g., Lee et al., 2022; Yadamsuren & Erdelez, 2016). However, what is particularly salient about these findings is that passive encounters were the *primary way* people became aware of the potential to change their views.

4.3.2 | Active seeking increases recognition of the need for change

For nearly all participants, an initial passive encounter of information that created awareness of the potential for change prompted subsequent **active seeking**, which increased recognition of the need for change. There were also many examples of passive encounters (both informational and social) increasing recognition of the possibility of change.

P13 engaged in both active seeking online and **social information seeking**. Her discussions with medical professionals prompted additional active seeking online, which in turn increased her inclination to go against her consultant's advice and opt for surgery. A blog, written by a doctor with the same condition who had opted for surgery was a particularly influential informational trigger for the change. Social information seeking, which involved contacting fellow sportspeople online and offline to understand their experiences of the various possible surgery options, pushed her closer to opting for a cheilectomy.

P4 reported both **active seeking** and **passive encountering** increasing his recognition of the need for change. While social media posts on the credibility of "Leaving Neverland" created awareness of the potential to change, it was the documentary itself (which P4 subsequently actively sought) that made him strongly feel the need to change. He noted the "graphic" testimonies of Jackson's now-adult accusers made it "very hard to question Michael Jackson's guilt." The testimonies, combined with an understanding the accusers would make no financial gain from the documentary, acted as an informational catalyst for the change. The final "litmus test that made me think" was a Tweet in #LeavingNeverland about "the bravery of one of the boys of going into as much detail as he did." In addition to the information he actively sought, P4 passively encountered information that increased his recognition of the need for change. He described an interview with Jackson's nephews, which presented "counterarguments...trying to defend Jackson's honour" that "just happened to come on" television

while he "wasn't looking for things" to watch. He reflected that Jackson's nephews "just didn't have the answers" to why his accusers were making these claims after his death. This further convinced him of Jackson's likely guilt.

P15 reported **passive (online) encountering**, **passive social encountering**, and **active seeking** as playing a role in her decisions to become vegan. When considering becoming vegan the first time, she met a hostel owner while traveling in Latvia who recommended the "Earthlings" documentary, featuring hidden camera footage of animal cruelty, stating "watch that and you'll become vegan for sure." This social encounter encouraged her to watch the video and ultimately increased her desire to be vegan. She also passively encountered PETA's "*disturbing*" "meat is murder" video game, where players had to save cartoon animals from being graphically slaughtered, in her Facebook feed. However, when becoming vegan for the second time it was active seeking that increased her recognition; she searched for and re-watched the "*horrific*" "Earthlings" documentary that had influenced her to become vegan previously, to "remind myself why I want to be vegan... it's almost masochistic." Two-thirds of the way in, she decided to become vegan again.

4.3.3 | Active seeking to support making the change

All participants reported **actively seeking** information to support making their change (i.e., to help implement it or "make it stick"). To support giving up beef, P8 sent medical questions to a friend as "she's my go-to person if I need any health advice... she's only a WhatsApp message away." As beef is relatively high in iron and P8 had anemia, she asked her friend "how to change my diet to compensate for reduced iron intake" and about iron tablets. She also searched the UK National Health Service website for general information on how to keep her iron levels up. Similarly, to support P10 in drastically reducing meat consumption, she met with a vegan acquaintance from Facebook to ask for tips and searched advice in online forums on "how I can implement it in my life, knowing I'm not very strong-willed...and I want it to stick." She also searched the BBC Good Food website for appetizing vegetarian recipes.

4.3.4 | Active seeking and passive encountering reinforce the decision to change

Participants reported acquiring information to reinforce the decision to change. This typically involved active seeking, and occasionally passive encountering. P17 conducted **active seeking** to provide additional evidence for his view the moon landing was faked; he "watched archive videos of the moon landings for hours." One was a 1965 NASA archive video on YouTube, showing astronaut Ed White spacewalking. He found it "strange" that White's helmet appeared to swivel, stating "what really made me curious about it is they made spacesuits that you could swivel the helmet, and then designed that out...what seems like a superior design has been phased out, and that to me seems odd." Rather than pay undue attention to comments such as "HELMET has moved! WTF?," he tried to "carefully" research the design of the spacesuit itself. He stated this was the only time he had seen a space helmet swivel in a NASA archive video, "so I just felt it was fake." It reinforced his decision to change as "it felt like it validated the little bit of research I did on the suits...the suits are not designed to swivel."

After P9 decided to "jump completely over the fence" by changing from voting Labour to LibDem, he **actively searched** for an online political compass to suggest a Party that would most suit his views, which reinforced his decision to change parties. P9 also **passively encountered** information that reinforced his decision: political articles on the BBC News website and Google News recommendations. He stated "I didn't actively seek it, but when information appeared... I took the view of, I'm going to be voting soon, here is my current stance... everything I was subsequently reading was me trying to challenge my view to either jump back over the fence or get back on the fence to think about voting for somebody else."

4.3.5 | Verifying the credibility of information used to make the change

Almost all participants reported **verifying** the credibility of information used during view change. Verification occurred both pre-change to ensure they were making an informed change, and post-change to reassure themselves of their decision. Participants' verification strategies have been previously reported (Fallis, 2004; Rieh & Danielson, 2007), but not in relation to view change. These included **analyzing the logic** of arguments presented in information, **checking author authority**, examining the **primary source**, **comments** or **underlying data** and by **actively seeking other information sources**.

P10 reported a variety of verification strategies when she was angered by a doctor posting on Facebook that many children had been hospitalized because their parents decided they should not eat meat. She **analyzed the logic** of his argument and thought "there is no logic in

this," stating "I just don't see the correlation saying we need to eat meat because we live in a cold climate. I know there are people who survive on fish in cold climates." She usually refrained from commenting, but "couldn't help" highlighting that protein can come from non-meat sources (such as dairy). Before commenting, she **actively sought** other authoritative information from the NHS website to verify the credibility of the information she would use as evidence "because I know the NHS site gets reviewed by professionals."

P1 also reported a range of verification strategies when deciding who to vote for in the 2019 Indonesian election. When religious leader Ustād Abdul Somad produced a YouTube video claiming he had recurrent dreams assuring him Prabowo Subianto was "the right guy" to be Indonesian president, P1 searched for background information on Somad on Wikipedia (an informal **authority check**) and noted "he's a lecturer in a state university." She thought, as a public servant, Somad must be certain of his view to make a public endorsement, because "as a lecturer you cannot say you've decided on a candidate publicly. You're not allowed." P1 also verified the credibility of Somad's YouTube videos by viewing the **comments** and reflecting on Somad's responses. Somad often prompted viewers to **fact-check** evidence he cited. P1 noted "it's like he's challenging me, so I'll pause the video and start Googling."

P17—who decided the moon landing was likely faked and the earth may be flat—also conducted extensive verification. He **analyzed the logic** underpinning the 1969 Apollo 11 moon landing video on YouTube, stating "it looks wonderfully choreographed. To me that reeks of very deliberate, considered 'one small step for man.' You come up with this very measured statement when you actually would be sweating bullets and wondering is my suit going to break? Am I going to slip on this ladder?" He concluded "it's most likely no one's ever been there." He had watched **primary source** NASA archive footage of the moon landings "extensively for hours," often frame-by-frame. He also **searched** for evidence to support claims made by "flat earth leader" "allegedly Dave" Murphy in a YouTube interview. He stated, "for things to be credible, I wanted to find not just people saying the earth's flat...here's the evidence for it." This demonstrates verification does not necessarily prevent formation of what P17 described as "fringe beliefs."

4.3.6 | Sharing information used to make the change

Like verification, information **sharing** is documented elsewhere (see Talja & Hansen, 2006; Wilson, 2010), but not pertaining to view change. A minority of participants discussed choosing to share (or not share) information that had influenced their view change. Those who shared it demonstrated awareness of its potential to change others' views.

P1 *did not* want to influence others with her political views. She thus **limited her sharing** to immediate family members. She "didn't share it with others...I have to be neutral." She did not share the video to influence her family, as they had "already decided" on another candidate, but to inform them of her change of view.

P8, on the other hand, *did* want to influence her husband's view on meat consumption. "Homo Deus" by Harari was foundational to her decision to give up beef for animal rights reasons; it "stayed in the back of my mind" throughout the change process. She described the author's discussion of how humans treat animals using an AI analogy to consider how, when intelligent enough, animals might treat us. She **shared** a recommendation for the book with her husband, telling him "you need to read this, I think you'll find it really interesting." When asked whether she thought the book influenced his views on animal welfare, she said "it probably did. He needed me to make the jump to influence his behavior."

4.3.7 | Expressing and debating the changed view (or not)

Post change, many interviewees either **expressed** their changed view (usually to friends, colleagues or family) and a few **debated** it with others (usually online). However, some consciously chose to **avoid expressing or debating** their views, to avoid confrontation with people with opposing views. Although **debating** views has been proposed as a potential solution to divisive political and social issues, with the potential to bridge divides (Dryzek, 2006), interviewees reported both positive and negative effects of debating and discussing their changed views. Furthermore, they did not engage in debates unconditionally; they disengaged when others presented extreme views or demonstrated a lack of empathy with or understanding of their view.

Some participants were willing to **express** their views to family and friends and **debate** them online. For example, P10 expressed her changed view on animal rights (which led to her reducing meat consumption) to her parents and partner—partly to test her views, but also to support sharing meals with her partner. Although her parents did not share her view, they responded "whatever makes you happy." Illustrating the tension involved in expressing alternative viewpoints, P10 joked "I think

people try to be nice about it and they don't really argue, because I think deep inside, they know I'm right." Her partner responded he would be "happy to eat vegetarian meals whenever you cook," demonstrating view changes can influence others' behavior. P10 illustrated that reconciling views through debate is not always possible online; when a Facebook user disagreed with her anti-zoo viewpoint, stating she did not think animals in zoos could survive in the wild, a back-and-forth debate ensued. Although good-natured, the discussion came to an abrupt halt without any evidence of empathy for or understanding of P10's view.

P5 **did not express** her changed view on marriage equality on social media to "avoid getting into Facebook arguments." Not all participants avoided social media debates, though: P16 asserted "you want a bit of conflict and a bit of debate, and healthy conversation and argument." P3 described an approach to mitigate for potential negative consequences when drafting social media posts or replies—he re-drafted a Tweet several times to balance the text's directiveness, persuasiveness and informativeness; when someone expressed a desire for an efficient recycling system, he re-drafted his reply (which argued "recycling is not a cure") "five times because I sounded like a Nazi...too moderate...not as informative as I wanted to." However, even a well-considered message did not guarantee productive debate, as sharply illustrated by P11, who lost one of his more right-leaning childhood friends because his own social media comments "were just rubbish, way too attacking." Recounting this experience P11 stated "rather than actually listening to his point of view, I was just like 'Brexit's wrong, everyone's a racist.'" He later reflected that his former friend "actually had a logical reason for Brexit: that he doesn't like imperialism" and lamented he "should've discussed it with him but didn't." He reflected that entrenchment in his existing views led to him avoiding a debate that might have been informative. He noted the ways in which social media promoted entrenchment, describing Twitter as "a shouting platform...there's a million voices all shouting at once." P12 supported this assertion, describing online discourse as "abysmal...it's usually 'you're a pig' or 'I love you.' It's not like there is a lot of intelligent discussion."

A range of factors including platform, rationale for sharing, context and previous experience influenced participants' decisions about expressing their views. Some thought sharing their views in was unlikely to provoke useful or supportive discussion. Many were wary of being inflammatory. Participants did not completely avoid discussing their views; they carefully decided when and how best to do so.

4.4 | Summary of the role of HIB in view change

Most participants **passively encountered** information (often **shared** by someone else), creating awareness of the potential for change. They then **actively sought** (or occasionally encountered) information that increased their recognition of the need to change. Some then actively sought information to support the practicalities of making the change and to reinforce their decision to change. Reinforcement was also occasionally achieved through passive information encounters. Post-change, participants decided whether to **share** the information that contributed to the change and **express/debate** their changed view. This potentially **seeded a view change in others** and perpetuated a cycle of symbiotic HIB and view change. This tight **symbiotic relationship between view change and HIB**, where HIB was found to both drive and facilitate view change, illustrates the importance of HIB in the human experience of changing views.

5 | DISCUSSION

Our work highlights the integral role of HIB in view change. It provides empirical evidence of perceived autonomy in view change and highlights the potential for future research into information-facilitated view change, view change-related HIB specifically and the role of information in fundamental human experiences (section 5.1). It can also inform systems design efforts for promoting informed and autonomous view change and promote a broader research agenda of understanding HIB to support democratic principles and values (section 5.2).

5.1 | The new information order revisited

Concerns about the new information order are rooted in how information may influence peoples' views and, in turn, their behavior. The main worry about echo chambers is they might prevent people seeing relevant and useful information, denying them autonomy and limiting their ability to make informed decisions (Helberger, 2011). By promoting only certain views or implying consensus where none exists, they may even limit the opportunity for public discourse, potentially eroding democracy (Bozdag & van den Hoven, 2015). Concerns about misinformation center on harms associated with believing it (Rubin, 2019), misleading and

possibly polarizing those who engage with it (Seargeant & Tagg, 2019).

While we did not investigate filter bubbles, echo chambers, or misinformation directly, and deliberately targeted people willing to engage with views other than their own, our findings are both reassuring and concerning. Our participants were much more willing to engage with viewpoints other than their own than the dominant popular narrative suggests; many actively sought information reflecting diverse views. They also routinely verified information, though this did not necessarily discourage formation of fringe beliefs. This suggests the need for new approaches to information literacy practice on verification, such as focusing on the fallacies that can arise from believing in misinformation (Musi & Reed, 2022) and the potential for future research to examine the relationship between passive information encountering and misinformation and the impacts of misinformation on view change.

Many also demonstrated awareness of the potential risk of being stuck in an informational "bubble" which, despite the low likelihood of actually getting stuck, may have a protective effect against manipulation, by encouraging reflection on information consumption. Perhaps more worryingly, though, many felt others were not always willing to engage with alternative viewpoints, and that attempts to have a discussion, especially on social media, were futile.

Work such as ours—focusing on the human experience of engaging with online information—can provide a new perspective on the risks of manipulation through information engagement. Our participants believed they were informed, behaving autonomously and working against the new information order. While participants recognized the information they engaged with influenced them, they did not think it unwittingly manipulated them. Their apparent agency in their view changes and exposure to a diversity of information highlights a degree of autonomy. However, this autonomy can sometimes have profound consequences; the participant who formed "fringe beliefs" did so willingly.

Our work complements previous work on how policy might mitigate against online harms (Helberger et al., 2015) by offering a novel human-centered perspective, and offering counterevidence to the popular narrative of people being unwilling to engage with alternative views to their own. Policymakers could take a similar human-centered approach to designing effective legislation against online harms such as misinformation.

Our work also highlights areas for future research; the importance of passive information encountering in view change makes this relatively understudied form of information acquisition (Fidel, 2012; Mckay, Makri, Gutierrez-Lopez, et al., 2020) important for future study, especially in the new information order. Of particular interest is the possibility information encounters may have negative societal impacts when examined at scale. Also, understanding the motivations for and strategies involved in deliberate information diversification is likely to provide new mechanisms for supporting information autonomy and reducing polarization. If, as we suspect, HIB research can help reduce polarization and the spread of misinformation, information science and HIB has a vital role to play in supporting democratic principles and values more broadly.

5.2 | Implications for the design of information interfaces

Our findings point to several ways information interfaces can support autonomous, informed view formation. Information diversity has already been heralded as an important design principle (Helberger et al., 2018). Nonetheless, how best to encourage people to actually engage with a diverse range of information reflecting different viewpoints is still an open research question.

Previous research has proposed several features of information interfaces that might facilitate deliberate diversification, including showcasing minority viewpoints, supporting discussion and reflection, and overt foregrounding of the role of algorithms (Bozdag & van den Hoven, 2015). Showcasing minority viewpoints may support the information encounters that spark view change, and would support those of our participants who explicitly wanted to see a range of perspectives. Our participants also wanted to exercise control over *how* they encountered information though, and the ability to *limit* what might be encountered. Some pointers may be found in McKay, Makri, Chang, & Buchanan (2020), which suggests people need to be able to curate or put boundaries on the spaces in which information encounters occur. Providing a means of setting these boundaries may provide them with greater autonomy and control. The same paper also suggests slowing the speed at which information interactions occur, which may provide time for reflection or deliberation—potentially improving the quality of debate (Dryzek, 2006) while simultaneously supporting considered view change.

Our findings also highlight the importance of transparency when recommending information that might form the basis of a passive information encounter by explaining how and why it was recommended. How best to provide *meaningful* transparency that minimizes the risk of unwitting manipulation while preserving the potential for surprise and delight—components of

serendipity (Makri et al., 2017), requires further research. While some interface changes may support more informed view change, view change-related HIB occurs across platforms. This means no single system is likely to support this process alone; a more holistic approach, providing support across multiple systems and sources, is likely necessary.

6 | CONCLUSION

This research presents an explanatory account of HIB in view change, highlighting its integral role. It finds that those people who have changed their views are not only willing to engage with information that reflects different views to their own, but also to engage in often extensive follow-up seeking, verification and debate surrounding it. Through their HIB, they actively shape their views (or at least perceive to) and sometimes attempt to influence others; they exercise as much autonomy and control as is possible within an information ecosystem that is, in places, highly-opaque. Our findings therefore call for meaningful algorithmic transparency and greater user autonomy and control to support truly autonomous view formation and change. Our findings also promote a broader research agenda of understanding HIB to support democratic principles and values. This understanding can deliver prosocial benefit by minimizing and mitigating against information harms.

This research provides a novel perspective on the new information order. Rather than invisible actors in an HIB process, or puppets acted upon by filter bubbles, echo chambers, and misinformation, our study puts those changing their views at the heart of the process and examines it from their perspective. This perspective highlights that those who change their views perceive they have strong autonomy in doing so. Participants themselves pointed to popular narratives about informational "bubbles," but also provided clear evidence of making their own choices about information consumption and view change. Their behavior further demonstrates that fears about the new information order are overstated.

This research makes two contributions; first, it highlights the importance of information encountering in view change, identifying a need for future research at this intersection. Second, and most importantly, it demonstrates the tight symbiotic relationship between HIB and view change. View change is not merely a context in which HIB occurs, it is a complex, information-rich experience in its own right. As with any early study of an information-rich experience, we paint this picture in broad strokes. More research is needed to fill in the detail. Future research areas include the specific nature and prevalence of deliberate diversification of information diet, when and how information encounters influence peoples' views and behavior, and how best to design information interfaces that support view formation and change in ways that are productive to individuals, communities, and society.

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