Exploring the use of constructive journalism to combat misinformation in the mainstream media

Natasha Renee van Antwerpen

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Table of Contents

List of publications in this thesis

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Abstract

Misinformation in the news presents a challenge to democracy's need for a well-informed citizenry and can carry severe personal and societal consequences. In addition to the ease of information sharing on social media, belief in misinformation is facilitated by various social, structural, and psychological factors, many of which are both mitigated and exacerbated by news media. I investigate the role of news media in the context of misinformation and its spread from a psychological perspective, with a particular focus on constructive journalism, an approach that draws on positive and cognitive psychology to reduce the mental health burden and increase the accuracy of reporting, as a potential response to assuage the negative consequences of news media in the context of misinformation and COVID-19.

The thesis consists of four studies where I use several methodologies to explore the boundaries of constructive journalism and the problem of misinformation in the news. An initial survey study investigated the relationship of information consumption to protective behaviours throughout COVID-19 using Bayesian structural equation modelling, through the mediators of anxiety, risk perception, and belief in misinformation among Australian ($N = 201$) and United States ($N = 306$) participants. Information consumption was associated with increased protective behaviours, a relationship partially mediated by increases in anxiety and risk perception, while belief in misinformation was associated with decreased protective behaviours in the United States sample. I also conducted semi-structured interviews with an international sample of journalism professionals to investigate the potential benefits and use of constructive journalism in the context of COVID-19 ($N = 11$), and misinformation ($N = 16$). Using thematic analysis, I generated two themes and six subthemes concerning the capacity of constructive journalism to assist in reporting

on COVID-19, including educating the public without inspiring undue fear and encouraging constructive responses to the pandemic.

I generated three themes and six subthemes regarding constructive journalism's potential benefit concerning misinformation, including audience engagement, democratic conversation and ideas of truth, and news media's effects on trust and beliefs. The final study consisted of a randomised-controlled repeated-measures experiment ($N = 238$), investigating the effect of constructive techniques on mood, comprehension, and trust using five articles adapted from existing constructive journalism pieces. Consistent with previous studies, participants in the Constructive Condition reported higher positive mood and lower negative mood relative to the Control group. However, participants in the Constructive Condition also performed worse on the comprehension measure and reported no differences in trust until accounting for mood and interest, at which point they reported a decrease in trust.

I investigate constructive journalism techniques – including inclusiveness and diversity, future orientation, and context – as potential mitigators of the belief and spread of misinformation by probing their effects on trust and comprehension. To foreshadow my conclusions, I find constructive journalism a promising way creators of news media (i.e., journalists) can influence individual and social cognition, beliefs in misinformation, and misinformation sharing. I also make several suggestions for further empirical and theoretical development.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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Natasha Renee van Antwerpen

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Chapter One: Introduction

"If you don't read the newspaper, you're uninformed. If you read the newspaper, you're mis-informed."

Attributed (questionably) to Mark Twain

Events in recent years, particularly the COVID-19 pandemic, have sparked a growing interest in misinformation and its consequences, both publicly and academically (Van Bavel et al., 2021). Research and public discourse on misinformation have primarily concerned social media and the sharing of false news, with concerns misinformation contributes to distrust, polarisation, and negative or misled behaviour, including lack of protective behaviours throughout COVID-19 (Pennycook & Rand, 2021; Van Bavel et al., 2021). However, the scope of the misinformation problem has likely suffered an extent of misinformation itself, including the volume of misinformation, its influence, and where people are most exposed to it (Allen, Howland, Mobius, Rothschild, & Watts, 2020; Altay, Berriche, & Acerbi, 2021; Guess, Nagler, & Tucker, 2019; Guess et al., 2020; Guess, Nyhan, & Reifler, 2020). Increasingly, research and commentary has pointed to the mainstream media as disseminating or facilitating misinformation and misperceptions, whether intentionally or inadvertently, and to increased news and information avoidance causing people to remain uninformed (Allen et al., 2020; Pantazi, Hale, & Klein, 2021; Skovsgaard & Andersen, 2020; Tappin & Pennycook, 2021; Tsfati et al., 2020).

Accordingly, my central aims were to understand the relationship of news media to the spread and belief of misinformation, culminating in four studies. I primarily investigated the potential of constructive journalism, which is an interdisciplinary approach to news reporting that draws on positive and cognitive psychology, to increase the positive and reduce the negative consequences of news reporting in the context of COVID-19 and misinformation.

Given the events occurring over the duration of the thesis, the first two studies focused on COVID-19, with the first examining relationships between information consumption, anxiety, risk perception, belief in misinformation, and protective behaviours throughout COVID-19; presented in Chapter Three. The second two studies considered the potential benefits and applications of constructive journalism in the context of COVID-19, presented in Chapter Four, and misinformation spread, presented in Chapter Five, drawing on the experiences and perspectives of journalism professionals. While the study focused on COVID-19 is reported first, these studies originally began with interviews on constructive journalism and misinformation spread, which were then extended to include questions on COVID-19 following the onset of the pandemic. The final study, reported in Chapter Six, investigated the effects of constructive journalism on mood, comprehension, and trust, to build on the evidence-base for constructive reporting techniques, and to test some of their proposed benefits. Overall, constructive journalism appears theoretically promising for increasing the positive and reducing the negative consequences of news media throughout COVID-19 and in relation to misinformation. However, for this benefit to be realised, further theoretical and empirical work is needed to refine, implement, and provide evidence for the approach. Suggestions for such work are further detailed in Chapter Seven, which presents the summary conclusions and discussion. To aid the reader in navigating the work, Figure 1 has been developed to provide a visual representation of inter-relations between the studies, with variations of this Figure being used throughout the thesis.

I adopted a systems thinking approach to conceptualise the problem of misinformation. Systems thinking encompasses an array of approaches and techniques, but broadly speaking takes a big picture view of complex problems by considering the influence and interactions of multiple factors, and the capacity of systems to adapt to changes within themselves. I used systems thinking

as a conceptual tool, which consisted of making a systems map to visualise and consider different facets of the misinformation problem. The map is depicted in Figure 2 and further explained in Chapter Two.

The following section overviews the literature and situates the problem of misinformation and news media in a contemporary and theoretical context. While this section is intended to provide an overview relevant to the thesis, the reader can also move ahead to the methodological framework or begin at the first study.
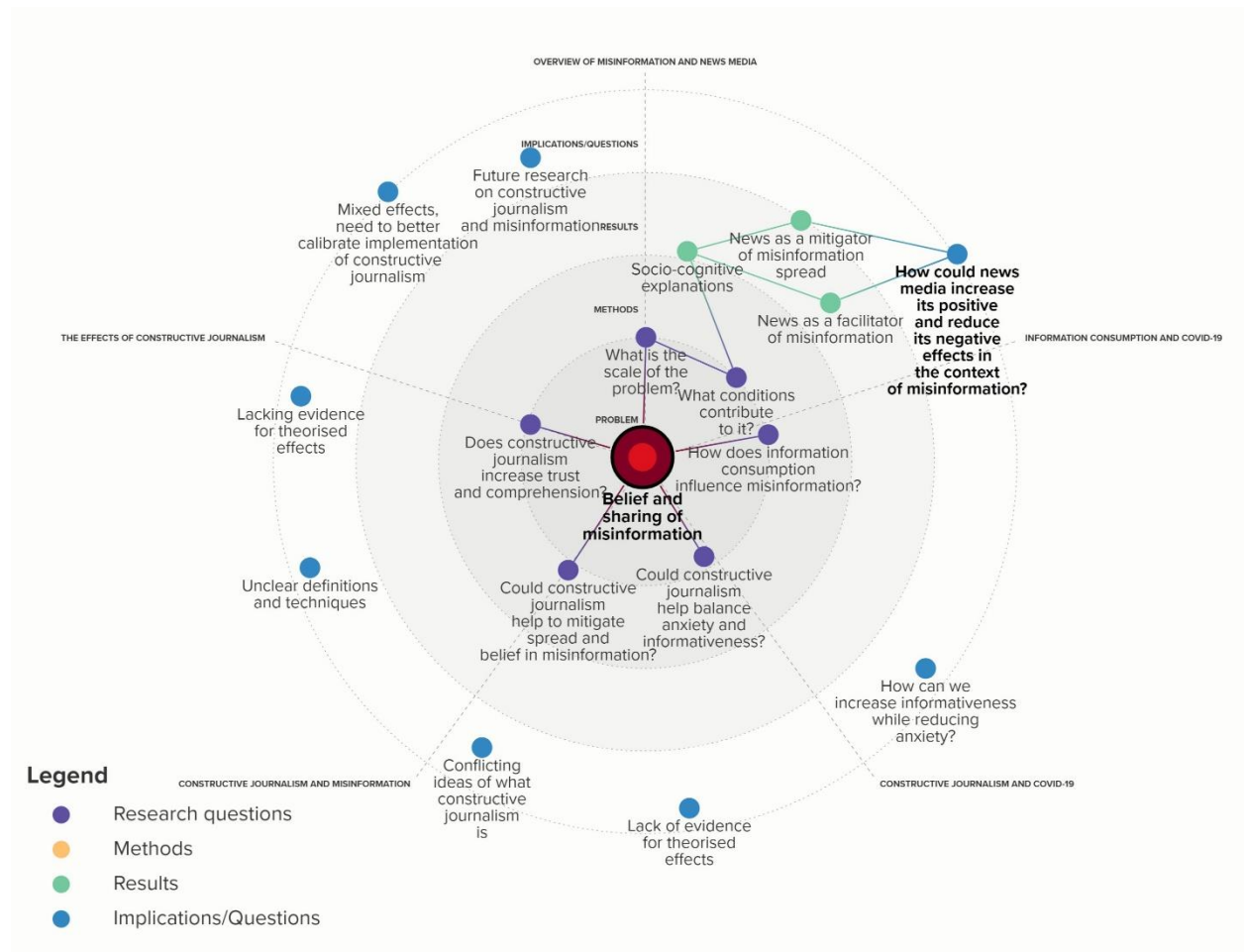
Figure 1. Outline of the thesis including the introduction and questions motivating each study. Variations on this figure will be used as a guide throughout the work.
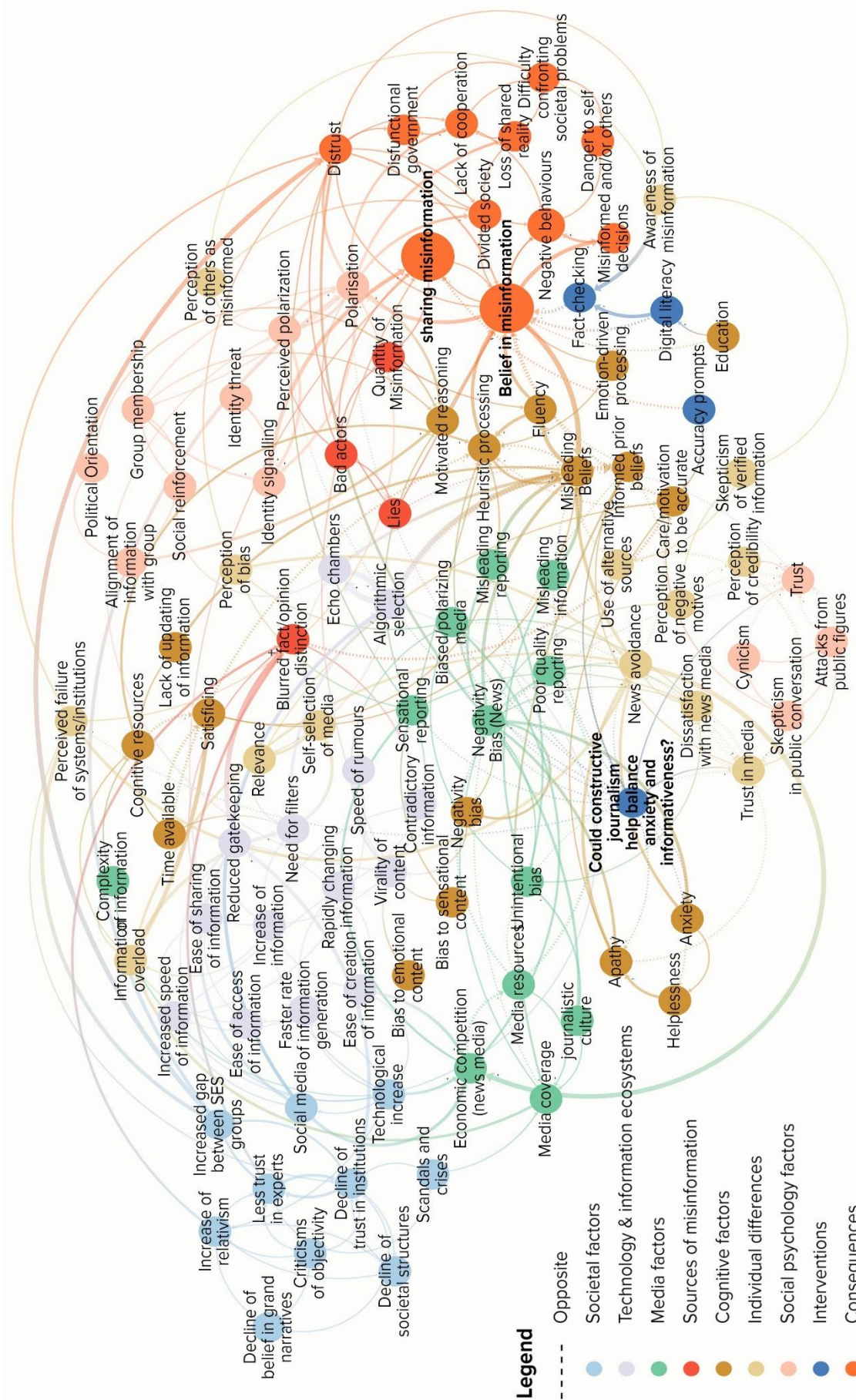
Figure 2. Working systems map of misinformation belief and spread. The systems map was used as a conceptual tool to illustrate the influences and relationships between societal, technological, media, social, and cognitive factors in the literature on misinformation spread and belief. I have made this map freely available at: https://kumu.io/Tarsha-vA/mipt#thesis-systems-map.

Overview of section one

I firstly situate misinformation within a contemporary context, including its definition, presence and ubiquity, and consequences. I also overview related concepts, including misperceptions and being uninformed. Misinformation is a broad category covering multiple forms of false and misleading information, an initial primer on definitions is detailed in section 1.1. Unless otherwise specified, I use misinformation to refer broadly to any false or misleading information, regardless of its form or the motivation behind its proliferation. Where the term '(mis)information' is used, it refers to all information, which may either be true or false/misleading. Similarly, fake news will refer to false information, unless otherwise specified. I use mainstream media and news media interchangeably.

Following misinformation, I outline the related concept of 'post-truth', which encompasses issues with contemporary information ecosystems and public debate, such as scepticism and declining trust, contestation over truth, and uncertainty or indifference to the veracity of information (Lewandowsky, Ecker, & Cook, 2017). I then overview psychological research and theory on misinformation and misinformed beliefs. While not exhausting the relevant literature, I provide an understanding of the influences on beliefs and information, including social and psychological contributors to selecting, interpreting, sharing, and believing (mis)information. Throughout both sections, I discuss misinformation as it pertains to mainstream media; including changes in the media landscape, the influence of mainstream media on trust, cynicism, and polarisation, and concerns news media contribute to misperceptions and misinformation spread.

Despite concerns of misinforming coverage, news media play an important role in fact-checking and providing verified information. Accordingly, I discuss decreasing trust and use of news media, and its consequences. I then overview constructive journalism, an approach suggested

to mitigate some concerns levelled at news media. The introduction finishes by presenting an overview of the current interventions and responses to misinformation. As an aid to the reader, Figure 3, a subset of Figure 1, provides a visual guide to the remainder of the Introduction.
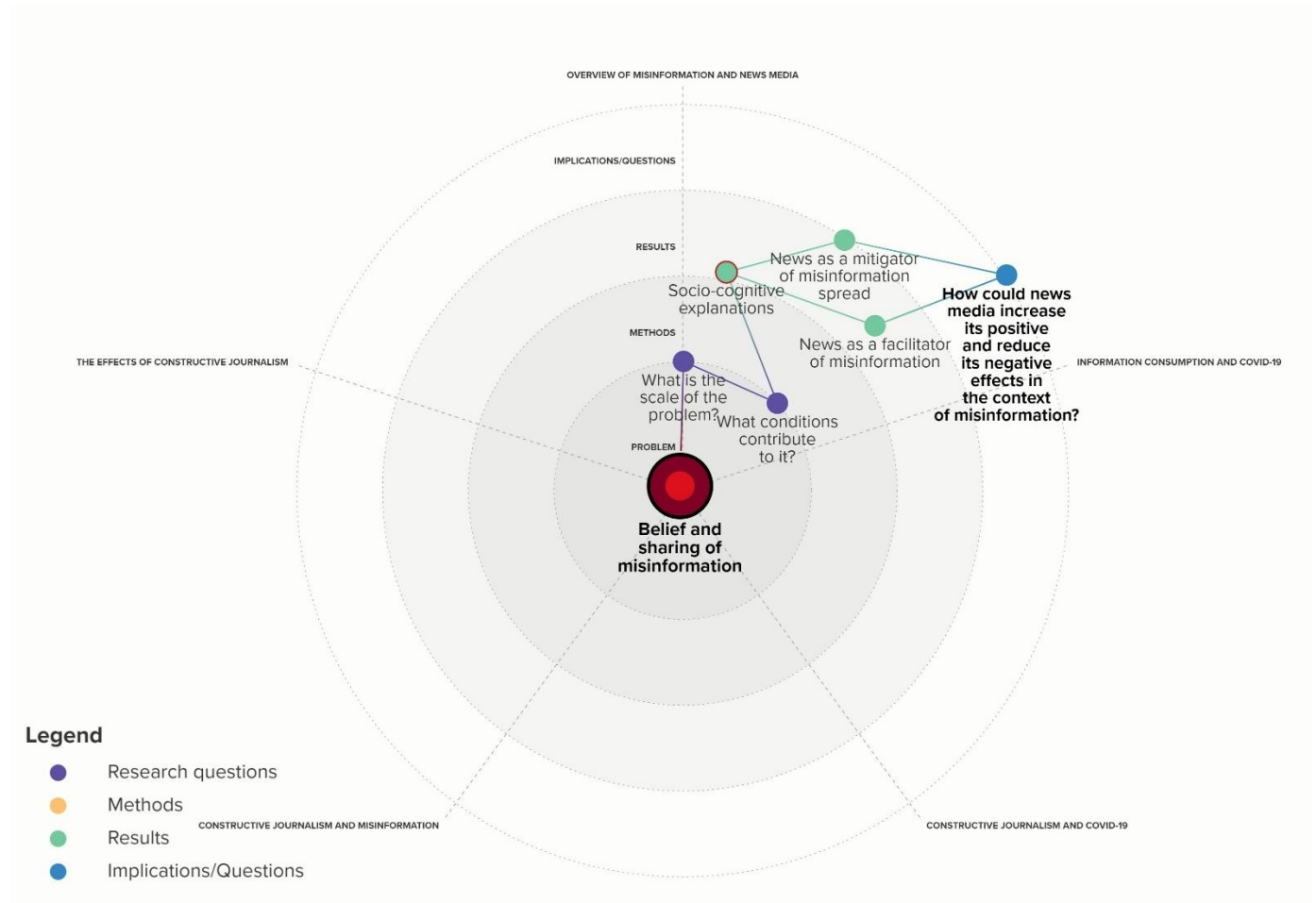
Figure 3. Visual table of contents, indicating the substance of the introduction.

1.1 Misinformation in context

Despite the attention and concern given to misinformation, the definition of misinformation and the extent of its proliferation are unclear and increasingly contested (Altay et al., 2021). Accordingly, I overview different types of misinformation, its prevalence on social media and in reported beliefs, and its consequences, including limitations in determining each.

1.1.1 Defining misinformation

While misinformation or fake news generally refers to false or deliberately fabricated content, it can vary in form and degree of veracity/falsity, making a precise definition difficult. Wardle (2017) distinguishes between seven types of mis- and disinformation[1], namely: (i) satire or parody, intended to entertain but with potential to fool; (ii) misleading content, which is factually true, but whose framing or construction suggests a false conclusion or impression[2]; (iii) imposter content, where a false source imitates a genuine one; (iv) fabricated content, new content which is false and deliberately intended to deceive and harm; (v) false connection, where associated features such as headlines, images, or captions, do not support the content; (vi) false context, where true content is mixed with false contextual information; and (vii) manipulated content, where genuine content is manipulated with intention to deceive. Pennycook and Rand (2021) also discuss so-called yellow journalism, which, while not necessarily false, is poorly researched and emphasises the sensational to generate money or attention. Additional categories include sponsored content, where advertising

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[1] Throughout the thesis I do not distinguish between mis- compared to dis- information; both refer to false information, with the former being spread unintentionally, while the latter is deliberately proliferated. The two frequently crossover (e.g., disinformation becoming misinformation when spread by unsuspecting consumers), the disentangling of which was not central to the thesis aims.

[2] Wardle (2019) suggests much of the harmful information in circulation has shifted from outright fake, to misleading representations of genuine content through hyperbolic and polarising headlines, or through subtle manipulations. She remarks that "in these efforts, context, rather than content, is being weaponized." (p. 43), which can make it harder to debunk or correct such content without reinforcing its legitimacy. See also Hameleers, Humprecht, Möller, and Lühring (2021).

or public representation is disguised as editorial content; propaganda, where content is intended to manipulate attitudes, values, and knowledge; and error, which includes mistakes made by news outlets and content creators (Groundviews, 2018). As further explained in Section 2.2.2, I use a broad definition of misinformation. However, understanding the different forms of misinformation is useful in interpreting its prevalence, and understanding how it is incorporated into, combated, or facilitated by mainstream media.

1.1.2 Presence and ubiquity

It is hard to estimate the extent of misinformation due to difficulties in measurement and definition. Nevertheless, several studies indicate misinformation may be less prevalent than often thought. Using panel data providing details such as channels, times, and URLs for content viewed on televisions, mobile phones, and desktops among nationally representative samples from the United States, Allen et al. (2020) found the prevalence of fake news to constitute less than 1% of people's media diets. Given the low proportion of false content, they suggest polarisation and misinformed beliefs are more likely attributable to ordinary news content or news avoidance than deliberate misinformation. Similarly, an analysis of Twitter during the 2016 United States election found fake news to constitute a relatively small amount of the information ecosystem; with fake news sources constituting approximately 1.18% of political exposures, or 10 URLs in the month prior to the election, and approximately 6% of the total news diet, consistent with prevalences in other studies (Grinberg, Joseph, Friedland, Swire-Thompson, & Lazer, 2019). Further, 0.1% of the panel accounted for 79.8% of fake news shares, and 1% of the panel consumed 80.0% of the fake news content (Grinberg et al., 2019). Similar work combining survey and online traffic in the 2016 United States election found 62% of fake news site visits came from 20% of the sample, and those the most politically conservative in their information diets (Guess et al., 2020). Some

commentators suggest the gap between estimates of quantity and public awareness of misinformation may point to mainstream media disseminating misinformation, even if inadvertently, such as through fact-checking (Allen et al., 2020; Tsfati et al., 2020). While misinformation may be less prevalent than initially thought, reported quantities of fake news exposure are limited by measurement strategies, which often rely on people clicking on or sharing content known to be false, and do not account for 'grey' areas of misinformation, including hyper-partisan content, or passive exposure, such as scrolling past false headlines[3] (Pennycook & Rand, 2021).

Just as evaluating the extent of misinformation is prone to difficulty and error, so too is evaluating the extent of belief in misinformation (Altay et al., 2021). One difficulty is the distinction between being misinformed and being uninformed. While misinformed involves believing and potentially endorsing false information, being uninformed involves lacking knowledge, including due to active efforts to avoid, for example, consuming news. However, the two are not easily differentiated in research, particularly where survey items do not include a 'do not know' option, or do not take into account confidence in beliefs, which can lead to over-estimations of belief in misinformation (Graham, 2021; Luskin, Sood, Park, & Blank, 2021). Being misinformed and uninformed may also reinforce one another, for example, those uninformed about the processes and evaluation of science and scientific findings are more likely to be misinformed about topics such as anthropogenic climate change (Scheufele & Krause, 2019). Measures of belief in misinformation may also be influenced by topic, with more politically salient topics resulting in higher estimates of misinformation (Nyhan, 2020). Throughout COVID-19, a report across six countries found reported rates of seeing a lot or a great deal of false or misleading information

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[3] Though passive exposure was in part accounted for by Allen et al. (2020).

were in the minority; though such measures are reliant on participants' ability to discern and recall the amount of false or misleading information they were exposed to (Kleis Nielsen, Fletcher, Newman, Brennen, & Howard, 2020). However, low rates of belief in misinformation were also found among a sample of $N = 5,000$ across Ireland, the United Kingdom, United States, Mexico, and Spain when directly surveying misinformed beliefs about COVID-19 in the pandemic's early stages (Roozenbeek et al., 2020).

While the prevalence of misinformation and belief in it are difficult to measure, certain sub-populations may be more susceptible to exposure and belief in misinformation (Pennycook & Rand, 2021). Individual differences found to influence belief in misinformation primarily include political orientation, though whether conservative political beliefs or ideological congruence of misinformation increase susceptibility is debated (Pennycook & Rand, 2021)[4]. Age has also been related to belief in misinformation, with older adults more likely to share and report belief in misinformation (Guess et al., 2019; Van Bavel et al., 2021)[5]. Education, scientific and numerical literacy, and trust in science have all been negatively correlated with belief in misinformation[6] (Bryanov & Vziatysheva, 2021; Roozenbeek et al., 2020; Van Bavel et al., 2021). Cognitive capacity and styles also appear to influence responses, including intellectual humility, correlated with decreased belief in misinformation (Koetke, Schumann, & Porter, 2021), and need for chaos, correlated with increased sharing of misinformation (Petersen, 2018; Van Bavel et al., 2021).

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[4] There is some suggestion that political liberals and conservatives are equally susceptible to misinformation and cognitive processes that facilitate its belief, such as motivated reasoning (Guay & Johnston, 2021), though see also Baron and Jost (2019). Associations between conservative political views and misinformation are usually then explained by the prevalence of conservative misinformation, and the greater discrepancies between scientific findings and conservative beliefs (Calvillo, Ross, Garcia, Smelter, & Rutchick, 2020; Pennycook & Rand, 2021). Though see Pereira, Harris, and Van Bavel (2020) on baseline susceptibilities to misinformation between Democrats and Republicans in the United States.

[5] Though this finding has not always occurred throughout COVID-19, see for example Rosenzweig, Bago, and Rand (2021) and Roozenbeek et al. (2020).

[6] Though see section 1.3.2 regarding motivated reasoning.

Additionally, while misinformation may be less prevalent than originally thought, it can influence important and even life-risking decisions in politics, health, and other domains, as demonstrated throughout the COVID-19 pandemic.

1.1.3 The consequences of misinformation

Correlational research has reasonably consistently found relationships between belief in COVID-19 misinformation and conspiracy theories and reduced protective behaviours (see for example Allington, Duffy, Wessely, Dhavan, & Rubin, 2020; Bridgman et al., 2020). However, some suggest that rather than a causal effect, this may be due to underlying factors, such as distrust of media and government, which are associated with belief in COVID-19 misinformation and reduced adherence to medical guidelines (Altay et al., 2021). Nevertheless, examples such as increased bleach consumption in the United States following its promotion as a possible treatment for COVID-19 suggest misinformation can be harmful in itself (Chary et al., 2020; Rivera et al., 2020). Recent experimental work also found exposure to online misinformation reduced COVID-19 vaccination intent (Loomba, de Figueiredo, Piatek, de Graaf, & Larson, 2021).

Across political misinformation, experimental work has found that, while misinformation changes belief in the misinformation, it has little to no effect on actual political behaviours, such as voting intentions (Guess et al., 2020). Just as the relationship between COVID-19 misinformation and reduced protective behaviours has been suggested to extend from common attributes such as distrust of governments and institutions, the common explanation for the seemingly limited influence of misinformation is that the falsities spread tend to be 'preaching to the choir' (Altay et al., 2021; Guess et al., 2020). In other words, those most likely to believe and be affected by misinformation are already predisposed to agree with it, leading to a minimal effect beyond increasing belief in the specific misinformation. Such suggestions align with experimental

work where corrections to misinformation were found effective in reducing belief in misinformation, but without affecting broader beliefs, judgements, or behavioural intentions (Hopkins, Sides, & Citrin, 2019; Wood & Porter, 2019). However, another study found misinformation affected behaviour without participants realising (Bastick, 2021), suggesting impacts on behaviour may go unregistered by participants, limiting the efficacy of behavioural self-report measures[7].

Despite suggestion misinformation may have a less severe effect on behaviour than initially proposed, such negative consequences are still of concern. Research on the influence of misinformation on behaviour is still relatively limited and may be context dependent. As such, claiming misinformation to have limited or no negative effect may swing the pendulum too far from initial concerns large-scale negative effects on behaviour. Regardless of the influence on behaviour, misinformation is suggested to be detrimental to the social fabric; most predominantly by decreasing trust and increasing polarisation across political lines and contentious issues (Van Bavel et al., 2021).

1.1.4 Summary: Misinformation in Context

Current research on misinformation has primarily been directed toward social media and the sharing of explicitly false stories online. However, estimates currently suggest a relatively low prevalence of misinformation online (e.g., Allen et al., 2020), and that news media may also be influential in misinformed beliefs, either through inadvertently spreading misperceptions (Tsfati et al., 2020), or through providing accurate information, in which case those avoiding the news

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[7] However, the applicability of this study to broader misinformation is questionable. The study measured unconscious behaviour as maximum tapping speed (MTS: tapping a key with one finger for a duration of 15 seconds), and had as its stimulus news articles either claiming MTS to predict factors such as intelligence and social success, or factors such as brutality and criminality. Participants were not informed the articles were fake before completing the MTS task.

may be left uninformed. Though smaller than often thought, there is argument that the volume of misinformation still has a negative influence, decreasing trust in institutions, experts, and true information, and making less clear the distinction between truths and falsehoods. Additionally, certain populations may be more susceptible to misinformation, and the ease of sharing on social media and online platforms can enable misinformation to reach a large audience, even if its belief and overall prevalence is low.

Similarly, the prevalence of belief in misinformation and its effect on behaviour are currently unclear and may be less extreme than initially proposed, though still detrimental (Pantazi et al., 2021). Accordingly, I investigate the relationship of information consumption to misinformed beliefs and protective behaviours, and explore constructive journalism as a potential response to increase the positive and reduce the negative consequences of news media.

1.2 'Post-truth' and misinformation

As previously noted, a consequence of misinformation is its impact on the social fabric, including decreasing trust and increasing polarisation, and a general distrust or disregard of facts (Van Bavel et al., 2021). Such phenomena are frequently captured in the context of misinformation as the 'post-truth' era. This post-truth era is characterised by a style of thinking where emotion and opinion hold greater sway than fact and truth (Lewandowsky et al., 2017; Oxford Dictionary). Key elements include a proliferation of misinformation, a decline of trust in experts and institutions, increasing polarisation and economic inequality, a fractured media and information environment, and an abundance of relativism in place of facts and objective notions of truth or reality (Lewandowsky et al., 2017). The argument follows that within this post-truth context, individuals can argue and believe notions of their choosing without relation to data or proof, or with reference to selective evidence (Lewandowsky, Cook, & Ecker, 2017; Lewandowsky et al., 2017). Similarly,

that truth and lies take less precedence than action, agendas, and political power (Stenmark, Fuller, & Zackariasson, 2018).

While the prevalence of misinformation in consumers' media diets, and its influence on political opinion, have been questioned, it has nevertheless been considered problematic in creating an environment in which both the interpretation and the facts themselves are disputed (Allen et al., 2020; Guess et al., 2019; Guess et al., 2020). Further aspects of post-truth and their relation to news media are discussed below, including the apparent rise of relativism and truth indifference; technology and the spread of misinformation; declining trust; and polarisation.

1.2.1 Relativism and truth indifference

History is replete with quotes of the decline of truth and obscurity of certainty[8], suggesting contestations over truth are not novel or unique to contemporary times. However, references to 'post-truth' suggest the spread of misinformation and truth-indifferent attitudes have increased, with some implicating an influence from academic movements, most particularly, relativist and postmodernist critiques (Stenmark et al., 2018). Postmodernist critiques are a broad and sometimes contradictory category. Generally, postmodern critiques include knowledge as socially constructed, formed within certain paradigms by actors who, willingly or unwittingly, shape knowledge production according to their own biases and agendas[9] (Stenmark et al., 2018). Additional elements of postmodernism include suspicion toward grand narratives, notions of truth,

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[8] For example, in the 17th century, Blaise Pascal wrote "Truth is so obscure in these times, and falsehood so established, that, unless we love the truth, we cannot know it.". See also Fuller (2018) for a discussion of the historical struggle dating back to Ancient Greece between differing ideas of knowledge and power, and Arendt (1961) for a discussion of the opposition of politics with factual truth, deception in democratic societies, and the advance of technology and communication leading to a "peculiar kind of cynicism – an absolute refusal to believe in the truth of anything, no matter how well this truth may be established." (p. 15).

[9] Such critiques frequently point to a relationship between knowledge and power; with power including the authority to decide what constitutes knowledge, and knowledge providing a tool used to obtain and retain power.

objectivity, and universal progress, as well as many frameworks of truth, epistemology, and explanation (Eagleton, 1996; Lyotard, 1984). Though prominent in the humanities, arts, and social sciences, postmodern critiques have also occurred in science fields, such as Kuhn's (1970) theory of scientific revolutions[10].

Schudson (2006) discusses postmodern critiques as amplifying an already existent tension between expertise and democracy. While democracy rests on principles of equality, expertise suggests some voices carry more weight in decision making. For expertise to function effectively requires respect and accountability; a mandate which becomes increasingly difficult in the face of widespread cynicism, distrust, and critiques of neutrality. Postmodern critiques of objectivity have also been problematic for journalism, which frequently upholds objectivity as a core principle (Beckett & Deuze, 2016). Similarly, journalism faces tensions between privileging expertise while conveying a wide range of perspectives (Schudson, 2006).

Contemporary societies have also been described as postmodern, referring to a decline of societal structures and restrictions, and an increase in multiculturalism and diversity (Stenmark et al., 2018). These changes have been suggested to create tension between conceptions of truth, whether cultural, religious, scientific, or moral, and the belief in them as universal realities; essentially, between respect for different perspectives, and the need for objective truth (Stenmark et al., 2018). The tension between perspective and objective truth is also reflective of tensions with journalism, which has faced criticisms against the notion of objectivity (Beckett & Deuze, 2016), and aims to present 'truth' within the context of many perspectives (Tsfati et al., 2020). While the

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[10] Kuhn's theory posits that scientific knowledge is advanced within the norms and sanctions of its time, before being overthrown by a new paradigm, with change providing a sense of progress toward truth.

extent to which postmodern society and critiques influence the spread of misinformation is unclear, they are proposed to create an atmosphere where truth is more uncertain and contestable.

1.2.2 Technology and the spread of misinformation

Throughout history, technological advancement has assisted in amplifying misinformation. Likewise, the internet and social media have increased the amount and availability of information and voices, and with it, the amount of misinformation, intentional or otherwise (Mezei & Vertes-Olteanu, 2020). While beneficial, technological developments have led to concerns of information overload, lack of gate-keeping, and amplification of cultural trends of cynicism and distrust (Bawden & Robinson, 2008; Verstraete & Bambauer, 2017).

The current media environment is often referred to as 'high-choice', reflecting the ease of access to a wide range of information sources and mediums, and is postulated to increase polarisation and fragmentation (Webster, 2005). Within high-choice information environments, information increasingly becomes subject to cognitive biases, with potentially negative consequences for the proliferation of (mis)information, as expanded in Section 1.3 (Hills, 2018). Misinformation often has an advantage over other information in online environments as, not needing a basis in truth, it can be shaped for virality (Vosoughi, Roy, & Aral, 2018)[11]. From a technological perspective, concerns have primarily addressed algorithms as contributing to a biased information diet through echo chambers and filter bubbles (Bakshy, Messing, & Adamic, 2015; Flaxman, Goel, & Rao, 2016)[12]. Such structures also provide greater incentive for news

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[11] Though see Altay et al. (2021) for a criticism of many interpretations of this study; in particular, that it examines a subset of news which only includes those fact-checked or contested (which the original authors also acknowledged).

[12] Echo chambers and filter bubbles are both characterised by a closed system of information in which similar views are promulgated, reinforcing beliefs and perception of their consensus, without exposure to opposing or diverse views. However, echo chambers are perceived to be driven by individual choice, primarily referring to selective exposure and a preference for confirming or consistent information,

media to produce stories which are more likely to go viral, and face greater competition from other information sources, reducing resources. Such changes may contribute to a reduction in reporting quality, and increased incentive to produce sensational or polarising content (Boyer, 2021; Guess, 2021; Pantazi et al., 2021).

Many arguments against online platforms have pointed to echo chambers encouraging the spread of fake news and polarisation, and enabling easier access to radicalised views and conspiracy theories (Flaxman et al., 2016; Lewandowsky et al., 2017). However, the internet and social media have also been considered levellers, enabling greater participation and voice to members and groups of society previously little-heard (Dubois & Blank, 2018; Verstraete & Bambauer, 2017). Similarly, the internet and social media can facilitate greater diversity of information and perspectives than in-person interactions (Dubois & Blank, 2018; Silver & Huang, 2019). Additionally, evidence on the influence of echo chambers remains unclear (Flaxman et al., 2016). Echo chamber studies often investigate single platforms, while users often access many platforms and sources in high-choice media environments, which reflect a higher diversity of information sources when accounted for (Dubois & Blank, 2018). Susceptibility to echo chambers is also likely influenced by individual factors, such as cognitive capacity, openness, political orientation, and digital literacy; as found in a large scale analysis of Twitter users (Barberá, Jost, Nagler, Tucker, & Bonneau, 2015). Similarly, a recent analysis using 2015-2016 data found the majority United States participants had relatively moderate media diets, with a small but influential portion prone to echo chambers and partisan news diets (Guess, 2021).

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while filter bubbles are driven by algorithms, which personalise the result of searches and social media feeds in a similar fashion (Bakshy et al., 2015; Nikolov, Lalmas, Flammini, & Menczer, 2019).

A recent literature review on the influence of social media on democracy similarly expresses ambivalence regarding its role. Social media appears to facilitate participation in young and developing democracies, while detrimentally affecting established democracies (Lorenz-Spreen, Oswald, Lewandowsky, & Hertwig, 2021). Verstraete and Bambauer (2017) in an analysis of trust and online information ecosystems, describe the internet as amplifying sceptical and nihilistic voices, and enabling a 'cascade of cynicism' (p. 130); with doubt easier to manufacture than trust. They argue cultural aspects of misinformation, including distrust and scepticism toward institutions, experts, and notions of truth more broadly, to be relatively under-regarded, despite their amplification in information ecosystems.

1.2.3 How much should we trust the trust crisis?

Declining trust in institutions such as politics and media may be problematic for democracy and misinformation spread, with belief in conspiracy theories and misinformation associated with lower trust (Uscinski, 2018). However, some researchers suggest declining trust in institutions to be overstated. Using large sets of longitudinal data, Van de Walle, Van Roosbroek, and Bouckaert (2008) and Rauh (2021) found trust in government and the public sector to primarily fluctuate rather than decrease over time. Rauh (2021) found trust relatively stable in OECD countries, with few demonstrating significant levels of decline[13]. Such findings contradict reports of trust declining in OECD countries, indicating assessments of trust and its fluctuations may be subject to differences in measurement and analytical method (Ortiz-Ospina, 2016). Similarly, in reviewing the perceived legitimacy decline in democracies, van Ham, Thomassen, Aarts, and Andeweg (2017) found time series data from 1973 to 2015 did not support declining legitimacy and political support in democracy. Of the 16 countries examined, most samples remained stable or increased

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[13] These few including the United States, Greece, and France.

on measures of political support at higher levels (such as political community and democracy as an ideal political regime). While support saw greater variation at lower levels (such as democracies as they functioned in practice, and for political institutions and authorities). These fluctuations were neither universal, nor long-term, leading the authors to conclude a crisis of legitimacy was not borne out by the data. As this examination concerned political support, not trust, the results may not be directly comparable, however, they suggest declining faith in democracy may be less extensive than suspected.

Turning to more specific national contexts, within the United States, trust in science appears to have remained relatively stable over the past 40 years, while trust in congress and the press have declined (Funk & Kennedy, 2020; Smith, Davern, Freese, & Morgan, n.d.). A 2019 report also found Australia to demonstrate the lowest levels of satisfaction with democracy since the 1970s, while trust in government had declined 20% since 2007 (Cameron & McAllister, 2019). However, following COVID-19, trust increased across institutions in Australia (Edelman, 2021). Overall, the extent to which decreased institutional trust is global is unclear, though in the United States, fluctuations in trust appear to have a decreasing trend (Rauh, 2021).

News media also share a convoluted relationship with trust. In addition to providing information, longitudinal analysis suggests a cross-national trust nexus exists between news media and other institutions, particularly democratic and political institutions (Hanitzsch, Van Dalen, & Steindl, 2017). A combined analysis of media content and longitudinal panel data found sensationalist reporting and 'game' formats, often used in political reporting, to decrease trust (Hopmann et al. 2015). While not providing causal evidence, in the United States, a rise in critical news coverage has coincided with decreases in political trust and legitimacy (van Ham et al., 2017). However, pooled data from 1983 to 2014 found individual news use was positively related

to satisfaction with democracy in nine European democracies, though whether news increased satisfaction, or satisfied people had higher news use, could not be determined by the data (van Ham et al., 2017). Experimental studies on media's influence over democratic variables such as political trust and cynicism are similarly mixed, leading van Ham et al. (2017) to suggest investigating contingencies that contribute to the effects of news exposure on variables related to democracy. In particular, van Ham et al. (2017) call for further research into the positive effects of media coverage, and the conditions under which they occur, as a complement to the largely negative effects focus of research on media consumption and political trust and legitimacy.

1.2.3.1 Trust in news media

Reviews of the literature on trust in news media note that measures of news trust and scepticism are far from clear, with no agreed-upon measure and with measures varying in referring to different types of media, specific news outlets, the reports themselves, or journalists (Fisher, 2016; Strömbäck et al., 2020). Similarly, measures rarely distinguish between media scepticism, which involves close examination and discrimination of news media, and media cynicism, which is based on a disposition not to trust, rather than examination (Cappella & Jamieson, 1997; Strömbäck et al., 2020). Nevertheless, most researchers and commentators have agreed that trust in news media has declined, with some referring to a decline beginning in the 1980s (Strömbäck et al., 2020). The Reuters Digital News Report, an annual global survey on news use, found less than 50% of participants to report trusting most of the news most of the time, including when reporting trust in the news media participants themselves use (comparative to news media more generally). Segregated by country, the highest rates of trust were 56%, with proportions being 29% and 38% in the United States and Australia respectively in 2020. Trust in news media was found to increase following the onset of COVID-19, though the extent to which this rise in trust was

maintained has been questioned (Newman, Fletcher, Kalogeropoulos, & Kleis Nielsen, 2019; Kleis Nielsen et al., 2020).

Strömbäck et al. (2020), in reviewing the surprisingly sparse literature on media trust and media use, similarly note that relationships between trust in news media and use of news media were modest, with other factors (such as habit and selection) contributing to patterns of news use. Another explanation is that consumers regularly balance intellectual scepticism and day-to-day pragmatism, particularly within modern society, which requires using systems and technologies which most people lack the skills or time to comprehend, and which they do not necessarily trust. Information and news media, and their associated processes of selection, may similarly be viewed with scepticism, but used out of a sense of pragmatism (Kleis Nielsen & Graves, 2017; Walton, Pickard, & Dodd, 2018).

However, Strömbäck et al. (2020) also found a consistent pattern of trust in news media being positively associated with greater use of mainstream media, and negatively with use of alternative sources, including those of questionable veracity; though such evidence was correlational, not causational. Such a pattern, and the overall extent to which trust in news media impacts engagement with news sources, are important considerations in the context of misinformation. Consumers turning to alternative news sources may increase exposure to misleading, false, or partisan news, contributing to polarisation and belief in misinformation. Conversely, avoidance of news media may lead to a larger section of the population remaining uninformed.

While decreased trust may be problematic, it is not necessarily irrational, and, some scholars have suggested, may not be undesirable where greater vigilance is encouraged when consuming information (Citrin & Stoker, 2018; Fisher, 2016; van Prooijen, 2018). However, a

decrease in trust in news media has flow on effects to trust in other institutions, such as governments, which are often accessed and assessed via the news (Citrin & Stoker, 2018). Democracies and societies are reliant on a degree of trust to operate effectively, with distrust in politics and institutions potentially reducing their efficacy and forming a self-fulfilling prophecy. Accordingly, a helpful distinction may lie between healthy scepticism and unhelpful cynicism (Cappella & Jamieson, 1997; Citrin & Stoker, 2018).

1.2.4 Polarisation

Concerning disillusionment with and cynicism toward institutions is the widening gap between those who trust institutions and those who do not. The Edelman (2020a) trust barometer found a worldwide increase in the trust gap between the informed public and the mass population[14]; with the informed public being more trusting of all institutions[15]. This gap between the informed and mass population was widest in Australia compared to other countries measured before the COVID-19 pandemic (Edelman, 2020b). In the United States, a trust gap also existed between political orientations, with Trump voters less likely to trust news media, consistent with other polls (e.g., Pew Research Centre, 2020). The growing trust gap may also contribute to polarisation, or distrust towards the perceived 'elite', with a higher trust in institutions, compared to those who perceive those institutions as less efficacious.

Concerning political polarisation, much of the current research is United States centric, limiting its generalisability. However, survey and experimental research have increasingly

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[14] Informed public referring to those who are aged 25-64, college educated, in the top 25% of household income for their age group, and report significant media consumption and engagement in public policy and business news. Mass population includes all others.

[15] See Sandel (2020) for a discussion on belief in meritocracy and the widening trust gap between the rich and the poor, or successful and unsuccessful, as the former respond with increased trust, and the latter with increased disillusion, to the systems and institutions of society.

suggested that, while polarisation is rising, the extent to which people are polarised is overstated online (Wilson, Parker, & Feinberg, 2020). Participants tend to perceive political opponents views and emotions as more extreme and divisive than suggested by existing evidence; a misperception often attributed to elites, partisan media, and social media, the latter of which selects for more polarized and divisive content (Enders & Armaly, 2019; Levendusky & Malhotra, 2016; Wilson et al., 2020). Experimental research[16] finds such overstatement leads to a perception of increased polarisation and misconception of the democratic values of those on the opposite side of the political spectrum (Parker, Feinberg, Tullett, & Wilson, 2021). News media has also been suggested to increase polarisation, with experimental work finding coverage of polarisation to increase audiences' affective polarisation (Levendusky & Malhotra, 2016).

1.2.5 Summary: Post-truth and misinformation

Overall, evidence for a 'post-truth' era is unclear. However, the term does encapsulate many concerns and changes relevant to misinformation within modern societies. Included in these is increased uncertainty about notions of truth, increasingly high-choice and potentially tailored information environments, declining trust at least among some sections of the population, and an increase of polarisation and perceived polarisation. Each of these are in turn both concerning to, and may be exacerbated by, news media. How these factors facilitate and relate to the consumption, belief, and sharing of (mis)information, including in mainstream media, is explored further below.

1.3 Why do people believe and share misinformation?

In a recent review, Van Bavel et al. (2021) note there is currently no singular theory cohesively addressing belief and proliferation of misinformation. In this section, I overview some theories concerning belief and sharing of misinformation, including heuristics and biases,

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[16] At the time of writing this study was under review.

motivated cognition as compared to 'lazy' thinking, social identity theory, and the role of emotion in misinformation belief; including their interactions with news media. While this section primarily concerns the interpretation and sharing of (mis)information, limitations on cognitive processing place natural constraints on individuals' capacity to attend and consume information, particularly within saturated information environments (Hills, 2018; Miller, 1956). These limitations may influence individuals' interactions with and assessment of (mis)information.

One such limitation is information overload, where the quantity of useful information exceeds the capacity to consume it (Bawden & Robinson, 2008). In reviewing the literature Bawden and Robinson (2008) find such overload can result in information anxiety, withdrawal and avoidance, or satisficing (accessing the minimum amount of information to achieve a goal and no more); which can reduce willingness to engage with new, contrary, or nuanced information. Information overload has been implicated in the spread of mis- and low-quality information in environments where information is abundant and attention scarce (Menczer & Hills, 2020).

1.3.1 Heuristics and biases

Experimental evidence investigating misinformation suggests belief in it is facilitated by heuristics and biases, and 'lazy thinking' (Pennycook & Rand, 2019). Such heuristics and biases are often considered in the context of system 1 and system 2 thinking styles (Tversky & Kahneman, 1974). System 1 thinking is fast and intuitive, often relying on heuristics and biases to deliver quick judgements with minimal effort. Conversely, system 2 involves deliberate processing, which is slower, more analytic, often more accurate, but also more effortful. A large focus of prior research has been to investigate analytical versus intuitive thinking as either an individual difference, or as impacted by nudges toward accuracy (see for example, Pennycook and Rand, 2019). However, inducing distrust can increase scepticism and analytical thinking and reduce

gullibility or acceptance of disinformation by increasing consideration of alternatives. Inducing distrust can therefore reduce susceptibility to belief in misinformation, however, as discussed previously, distrust can likewise reduce belief in true information (Mayo, 2015; 2019). In the following section, I overview some of the heuristics and biases most relevant to interpretations of misinformation and mainstream media.

Confirmation bias

Confirmation bias describes the tendency to seek out and more easily believe information congruent with prior beliefs while being more sceptical of information that contradicts those beliefs (Kahan, 2017). When evaluating information, people are inclined to draw upon memories and stored information that supports, rather than contradicts, their hypotheses (Tversky & Kahneman, 1974). Experimental evidence suggests confirmation bias also operates in recognising expertise; with scientific 'experts' and expertise more likely deemed inexpert where they disagree with participants' viewpoints (Kahan, Jenkins-Smith, & Braman, 2011).

Confirmation bias also impacts media consumption, with audience members often selecting for news that aligns with their pre-existing views and positions, a phenomenon known as selective exposure (Stroud, 2008). Beyond encouraging a self-reinforcing cycle of confirmation bias, selective exposure may encourage misperceptions, such as greater consensus on controversial views (Harvey et al., 2018). Similarly, selective exposure can contribute to the perception of false polarisation; the perception that political groups are more polarised than they are offline (Brady, Crockett, & Van Bavel, 2020; Levendusky & Malhotra, 2016).

Continued influence effect

The continued influence effect has frequently been evinced in misinformation experiments, with rescinded or corrected misinformation remembered and incorporated into participants' causal

explanations, even where corrections were accepted (Ecker, Lewandowsky, Fenton, & Martin, 2014; Ecker, Lewandowsky, & Tang, 2010; Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012; Rich & Zaragoza, 2016). Experimental work suggests the continued influence effect to be somewhat reduced when warning participants of possible misinformation, and further, though still minimally, by explaining the continued influence effect. Providing warnings and alternate causal explanations for events produced the greatest reduction; suggesting the effect likely stems from a preference for coherency, and the encoding of misinformation into memory of an event, creating difficulty removing it when the information is later retracted (Ecker et al., 2010). Another explanation is that familiarity can provide a subjective sense of truth, and thus even following retraction, misinformation can feel true. As expanded on later, this continued influence effect is problematic when considering news media in the accidental perpetuation of misinformation within mainstream media, and the lack of context in much news reporting.

Fluency

Belief in information is partially shaped by coherence and familiarity, with narratives providing a scaffold or basis of prior beliefs, against which facts and information are evaluated. Information that is easier and more fluent to process is more likely perceived as true (Fazio, Brashier, Payne, & Marsh, 2015; Schwarz & Newman, 2017). Previous exposure and beliefs thus influence belief in misinformation, as feelings of familiarity and recognition can lead to an intuitive or phenomenological sense of truth or insight, even where claims are false or implausible (Fazio, Rand, & Pennycook, 2019; Laukkonen, Ingledew, Kaveladze, Schooler, & Tangen, 2020; Schwarz & Newman, 2017). Similarly, under experimental conditions, participants demonstrated no difference when detecting contradictions for known and unknown facts, provided misinformation was semantically fluent (Fazio et al., 2015). These feelings of 'truthiness' are suggested to save time and cognitive resources, encouraging their use over critical information processing (Fazio et

al., 2015; Schwarz & Newman, 2017). Misleading narratives can, therefore, contribute to false senses of truth when encountering explicit pieces of misinformation which align with a broader narrative.

Negativity bias

Among the heuristics and biases documented by Tversky and Kahneman (1974) is a tendency to weigh negative information more heavily than positive information, leading to a higher selection of information about risks, rather than balanced information which also considers benefits. As has been pointed out by commentators (e.g., Bauman, 2013; Rosling, Rosling, and Rönnlund, 2018), despite living in a period of history with improved poverty rates, healthcare, and other measures of safety and well-being; fear, anxiety, and perception of risk have increased; likely due to the propensity to select for and attend to negative information, which, given the extent of information in high-choice environments, is easily accessible.

Biases and the news media

The negativity bias is also reflected in news media, which preferences stories of crisis, scandal, disaster, and other negative events (Soroka, 2012). This predilection to the negative has often been explained in terms of the aims of journalism; for example, acting as a watchdog, warning of and reporting on threats and hazards, encouraging a healthy scepticism, and acting as a catalyst for positive change, and because the cognitive negativity bias results in greater audience attention to negative information (McIntyre, 2015; Soroka, 2012). However, this negativity bias may encourage misperceptions and unhealthy cynicism, and contribute to the negative effects of news on mental health (Baden, McIntyre, & Homberg, 2019; Cappella & Jamieson, 1997; Gyldensted, 2015; Rosling et al., 2018; Schudson, 2011).

People are biologically predisposed to attend negative stimuli more than positive stimuli, and in an experiment attended and retained more when viewing negative than positive news content (Soroka, Fournier, & Nir, 2019). In combination with the availability bias, which gives greater precedence to easily recalled information (Tversky & Kahneman, 1974), this negativity bias creates a cycle. The greater the proportion of and attention given to negative news, the more accessible negative examples are, and therefore the more likely they are to be recalled or thought true or representative. Negative framing has thus been argued to contribute to misperceptions including increasing crime rates or a greater intake of immigrants than corroborated by existing evidence, likely due to prominent news coverage of crime and immigration (Brown, Ali, Stone, & Jewell, 2017; Schemer, 2013; Wright, DeFrancesco, Hamilton, & Machado, 2019). Once formed, confirmation bias lends a negative perception strength by weighing evidence in support of it (e.g., a news report of a robbery will act as confirmation crime is increasing). The cognitive negativity bias has also been thought incentive for the over-representation of negative content in news media, which relies on consumer attention to provide funding, and is therefore motivated to frame news negatively to garner attention (Trussler & Soroka, 2014). Figure 4 demonstrates these interactions.
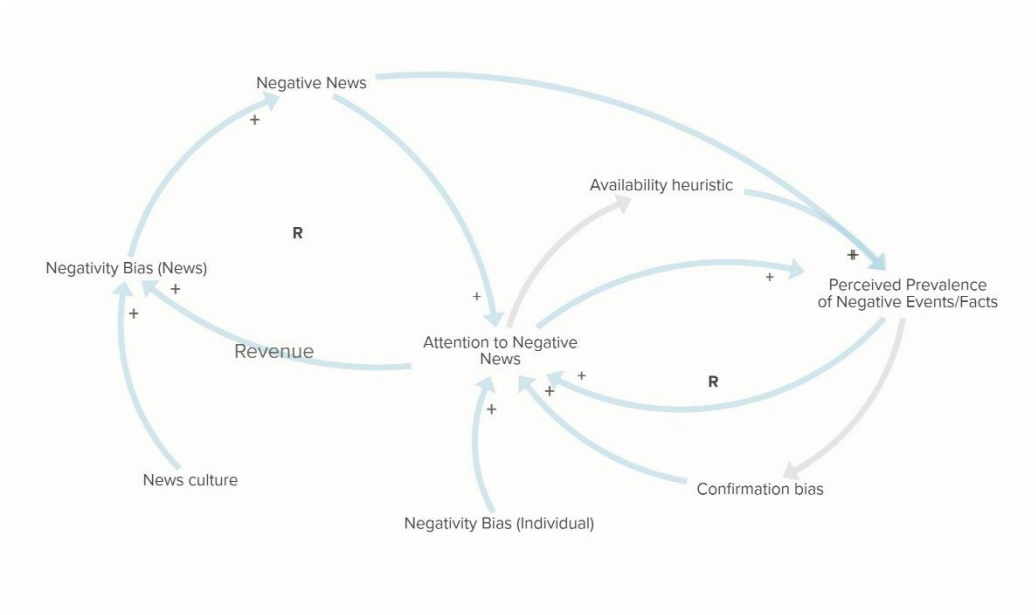
Figure 4. The negativity bias of news interacts with cognitive biases to produce an impression of the world as more dangerous and less developed than reasonable evidence would suggest.

The cycle depicted in Figure 4 is also suggested to contribute to widespread misperceptions, including a lack of awareness about developments, and an increased sense of fear and risk (Rosling et al., 2018). Drawing on Tversky and Kahneman (1974)'s work on heuristics and biases, Rosling et al. (2018) list ten 'instincts', depicted in Figure 5, which contribute to common misperceptions of the world on issues including changing rates of poverty, health, and education. Another factor in the negativity bias of news media and individuals is that positive developments often take longer, and therefore provide less urgency or interest than negative events (Bauman, 2013; Rosling et al., 2018)[17].

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[17] An idea reflected in common wisdom, i.e., "Rome wasn't built in a day, but it burned in one."

INSTINCT

VERSUS

FACTFULNESS

ROSLING'S TEN INSTINCTS AND HOW TO
MITIGATE THEM

1. THE GAP INSTINCT Divide in two by extremes Locate the majority	**2. THE NEGATIVITY INSTINCT** Greater precedence to negative information Expect negative news
3. THE STRAIGHT LINE INSTINCT Presumption of linear trends. Imagine non-straight lines	**4. THE FEAR INSTINCT** Greater attention to threats. Calculate the risk
5. THE SIZE INSTINCT Underestimate progress, overestimate other proportions Check proportions	**6. GENERALISATION INSTINCT** Quick categorisation and stereotyping. Question your categories
7. THE DESTINY INSTINCT Things stay the same. Notice slow changes.	**7. THE SINGLE PERSPECTIVE INSTINCT** Limited to familiar views and solutions What other solutions/views exist?
9. THE BLAME INSTINCT Prefer simple cause and effect. Look at systemic factors	**10. THE URGENCY INSTINCT** 'Now or never'. Take small steps

Figure 5. Rosling's ten instincts and suggestions to combat them.

Also relevant to news media and misinformation are broader narratives which, while factually correct, encourage false beliefs (Tandoc, Lim, & Ling, 2018). While this section is primarily concerned with systemic issues that lead to misperceptions, news media have also been responsible for more episodic cases of misinformation, which have had strong and even fatal ramifications. Such incidents include the 'children overboard' incident in Australia, where false

reports of asylum seekers throwing their children overboard contributed to harsh discrimination and policy (Commonwealth of Australia, 2002), or false reports of riots, violence, and crime in the wake of Hurricane Katrina in the United States, with media reports contributing to a delay in rescue efforts, and harsh treatment of victims by police forces who believed them hostile (Solnit, 2010).

In this work, I investigated constructive journalism, one school of which draws on cognitive psychology, particularly work on heuristics and biases, with an aim to produce news coverage which is less misleading (Haagerup, 2017). Constructive journalism also looks to include greater context, potentially mitigating against phenomena such as the continued influence effect and reducing the extent to which episodic coverage promotes narrative misperceptions.

1.3.2 Motivated Cognition and/or Bayesian Updating

A prevalent theory explaining belief and endorsement of misinformation is motivated cognition, also known as motivated reasoning or identity-protective cognition (Flynn et al., 2017; Kahan, 2017; Kunda, 1990). Motivated reasoning includes both directionally motivated reasoning and accuracy motivated reasoning. While directionally motivated reasoning is concerned with upholding the worldviews, core beliefs, and subsequent desires of the interpreter, accuracy motivated cognition is concerned with reaching accurate and factual beliefs (Flynn et al., 2017; Kunda, 1990). In the context of misinformation, discussion of motivated cognition primarily refers to directionally motivated reasoning and its influence on decisions to believe and endorse (mis)information (Kahan, 2013, 2017). In the context of misinformation, the literature has also drawn a relationship between cognitive and numerical aptitude, or greater cognitive sophistication, such that it increases directionally motivated reasoning (Kahan, 2013, 2017).

However, Tappin and Pennycook (2021) suggest cognitive sophistication may be magnifying the influence of prior beliefs, which share some correlation with political identity,

rather than the effects of motivated reasoning. They suggest a Bayesian process of participant information updating to explain some findings in motivated cognition studies. In a series of experiments drawing distinctions between political identity and prior beliefs, they found cognitive sophistication measures to increase the influence of prior beliefs when evaluating information, rather than the influence of political identity. Political identity did still influence evaluations of information; however, these effects were not magnified by cognitive sophistication when accounting for prior beliefs, indicating a more complex relationship between cognitive ability and belief in misinformation. They argue belief updating may be more akin to a Bayesian approach, that is, information is evaluated in line with prior beliefs and evidence, and this effect is amplified by cognitive ability, rather than political reasoning. The difference between these conceptions of the role of cognitive sophistication in motivated reasoning is depicted in Figure 6.
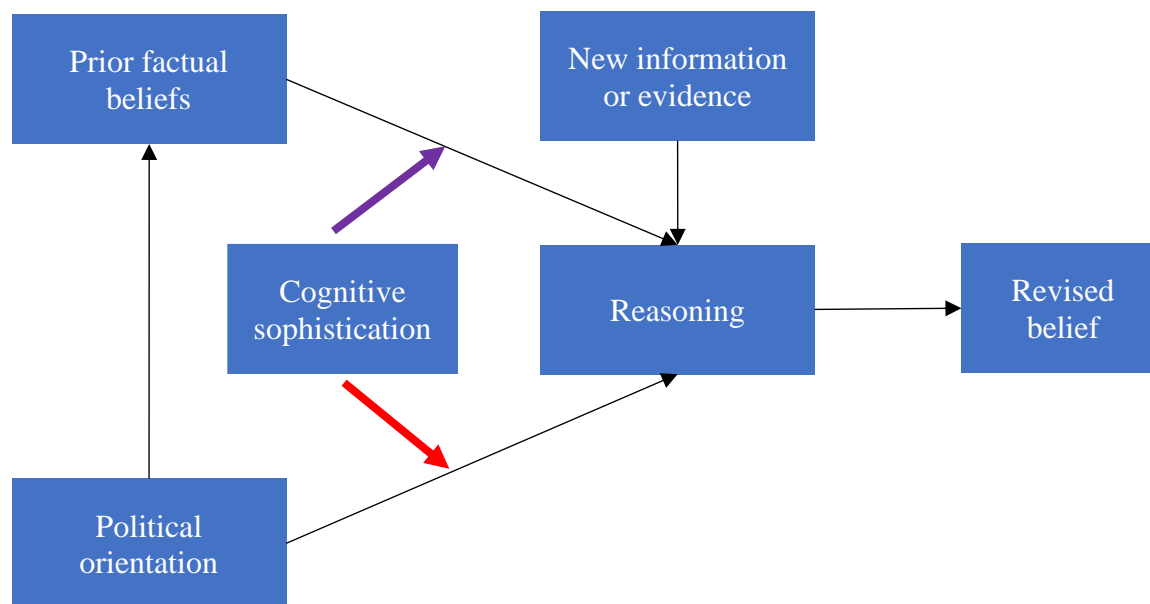
Figure 6. Directionally motivated reasoning in the face of new evidence; red arrow indicates cognitive sophistication as increasing motivated reasoning as in Kaplan (2013), purple as increasing influence of prior beliefs as in Tappin and Pennycook (2021).

Recent criticisms argue politically motivated reasoning is less common than suggested (Pennycook & Rand, 2021), and is demonstrated in approximately equivalent quantities across political groups (Guay & Johnston, 2021). Additionally, many studies do not appropriately allow for the determination of politically motivated reasoning without separating the influence of prior beliefs (Tappin, Pennycook, & Rand, 2020). Such differences are important in determining which interventions are likely to be more effective in the context of misinformation. If information is primarily interpreted through politically motivated reasoning, interventions which reduce the politicisation of messages are likely to be more efficacious. However, if a process of Bayesian updating is more common, a stronger focus on information-based interventions may be more beneficial (Tappin et al., 2020). In the context of news media, both changes to the politicisation and the content of reporting present avenues for intervention, including through constructive journalism. However, understanding which processes are at work in the interpretation of (mis)information is also helpful in shaping such interventions. Tappin and Pennycook (2021) also point to a lack of research on the factors that influence prior beliefs, such as family and media, often due to difficulties with measurement. Accordingly, while motivated cognition and the role of sophisticated cognition in aiding directional goals have explained belief in misinformation, it is unclear the extent to which this is explained by, or interacts with, prior beliefs and other factors underlying those beliefs, including use of news media. While I do not directly address the role of belief formation and Bayesian updating in the works of this thesis, I provide a high-level summary here as background context that contributes to the overall understanding of the thesis context.

1.3.3 Social Identity Theory and the motivation, attention, and design (MAD) model

Linked to motivated reasoning have been concerns of polarisation, engagement with moral and emotional content on social media, and sharing of (mis)information related to political

identity; the investigation and explanation of which has often drawn on Social identity theory (SIT) (Tajfel & Turner, 1979)[18]. Polarisation likely increases the salience of political identity and forms a risk factor for sharing and believing misinformation, including as actions serving to reinforce or signal political identity (Brady et al., 2020; Van Bavel et al., 2021).

Brady et al. (2020) draw on SIT in their motivation, attention, and design (MAD) model of moral-emotional content sharing on social media, making the case that social media amplifies group identities and related motivations, particularly in the political realm. The polarisation which often occurs in political discussions on social media, therefore, creates an environment in which inter-group conflict is common. Collectively, motivation to engage in communication and sharing which supports the in-group and reduces the out-group, and the design of social media platforms that facilitate these actions and motivations, have been purported to lead to a sense of false polarisation. False polarisation refers to instances in which people's opinions appear more extreme than they are, and the political divide more polarised than it is between group members (Levendusky & Malhotra, 2016). The attention aspect of the MAD model refers to the increased attention given to moral-emotional content, which is shared at a greater rate than morally and emotionally neutral content (Brady et al., 2020; Brady, Wills, Jost, Tucker, & Van Bavel, 2017). Attention is also affected by factors such as novelty, with the suggestion that emotionally baited content loses its attention-grabbing quality once users have become accustomed to it (Brady et al., 2020).

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[18] SIT proposes people naturally create categories of in-groups and out-groups, with a desire to improve the perception of their in-group relative to the out-group(s). Individuals are therefore motivated toward actions which affirm their identity within the in-group, including adherence to norms of communication within the group, and which serve to either bolster the status of the in-group, lower the status of the out-group, or both. Actions or communications motivated by social identity are more likely to be conducted by actors who identify strongly with the in-group, and under conditions of inter-group conflict or threat.

I do not address the MAD model or SIT within the thesis. However, the motives encouraged by social media and group identity, and the occurrence of false polarisation, provide background context for the motives of (mis)information consumers and information producers, including news media. Where they are driven by commercial goals or needs, news media can be motivated to report in increasingly attention-grabbing ways, including through the use of sensationalised, emotionally charged, and polarising content (Boyer, 2021), which can contribute to decreased trust (Hopmann, Shehata, & Strömbäck, 2015). As news media may also contribute to polarisation in some contexts (Levendusky & Malhotra, 2016), such theory points to the utility of changes to news reporting which reduce exacerbated perceptions of polarisation.

1.3.4 Emotion and belief and spread of information

Currently, research on emotion in misinformation spread and belief is relatively limited. Experimental evidence has suggested emotional reasoning increases belief in false headlines, though not true headlines (Martel, Pennycook, & Rand, 2020). Previous experimental work found anxiety to increase belief in false claims by representatives from the opposite political spectrum to participants, while anger increased belief in false claims by representatives of parties aligning with participants' political beliefs. However, when corrections were present neither emotion significantly affected accuracy (Weeks, 2015). Consistent with emotion reducing reasoning and increasing reliance on heuristics, oversimplified narratives and messages demonising others are more effective in the context of fear (Wardle, 2019). Immigrants are common targets of these narratives and messages, including by mainstream media (Herman & Chomsky, 2011). Similarly, experimental research on immigration news provoking high-arousal emotions, an increasingly common attribute of news, found such arousal contributed to greater displays of motivated reasoning (Boyer, 2021).

While studies have found negative emotion to increase (mis)information spread (see for example Fang and Ben-Miled, 2017, and Tsugawa and Ohsaki, 2015), other work suggests positive news to spread faster (Berger & Milkman, 2012). Berger and Milkman (2012) suggest it is arousal, rather than positive or negative emotional valence, that contributes to virality; with awe and anger (high arousal emotions) provoking posts receiving more attention.

Collectively, these results suggest emotion influences news and (mis)information belief and sharing, though the exact mechanics of individual emotions are currently unclear. I investigated the role of anxiety in the relationship between information consumption, belief in misinformation, and protective behaviours during COVID-19. I also investigated constructive journalism as an approach with the potential to reduce some of the negative consequences of news media, including negative and sensational content and its influences on mood. One of constructive journalism's main proposed effects is the reduction of negative and increase of positive mood because of news reporting. The influence of emotion on sharing and believing misinformation is therefore relevant to understanding its potential benefit, and possible difficulties in its proliferation.

1.4 The second dimension of fake news

Returning to concerns of news media, thus far I have focused primarily on the negative effects of news consumption, including misperceptions, cynicism, and polarisation (Cappella & Jamieson, 1997; Robinson, 1976; Tsfati et al., 2020). However, news media are also important for democracy, contributing to a well-informed citizenry, holding power to account, and, more recently, fact-checking (Tsfati et al., 2020). As in Section 1.2.3.1, declining use of and trust in news is problematic for democracy and an informed populace. Relevant here is Egelhofer and Lecheler (2019)'s distinction between two dimensions of fake news; one being false content

masquerading as genuine news, the second as an accusation intended to reduce the legitimacy of genuine journalism and news media. Experimental work has found political discourse about 'fake news' to decrease trust in mainstream media and discernment of genuine news (Van Duyn & Collier, 2019). Similarly, longitudinal work has found exposure to online misinformation relates to decreased trust in mainstream media (Ognyanova, Lazer, Robertson, & Wilson, 2020); suggesting misinformation and awareness of it, including weaponisation of 'fake news', contributes toward distrust in mainstream media.

1.4.1 Audience perceptions of 'fake news'

A multinational focus group found audience members aware of the use of 'fake news' to reduce journalistic credibility. However, the term also captured frustrations with information quality. Based on their investigation of audience perceptions of fake news, Kleis Nielsen and Graves (2017) suggested that while academics, journalists, and policymakers have often focused on fake news as fabricated or explicitly false news, audience perceptions of fake news were dependent on their view of news more generally, and reflected discontent with public sources of information, including those from official sources. These official sources included news reporting, with participants describing a high prevalence of false and low-quality information. A mixed-methods study on participants' use of news on social media found a similar dissatisfaction with the information environment, and described consumers' use of information as a form of 'generalised scepticism', with all forms of information and selection being suspect, though used out of pragmatism (Fletcher & Kleis Nielsen, 2019).

Newman and Fletcher (2017) summarise four main reasons for audience scepticism in the context of news media. Firstly, increased polarisation, which led to concerns of bias and agendas across social and mainstream media. Secondly, lack of representation, with mainstream media

perceived as elitist and out of touch. Thirdly, changing economic models lowering journalistic standards, with consumers perceiving accuracy to fall victim to more attention-grabbing features, such as emotive, partisan, and sensationalist content. Finally, an increasing multitude of perspectives, enabled by the internet, creating confusion or casting scepticism over previously irreproachable news organisations. Arguably participants willing to undertake a survey on news use and scepticism may be predisposed to certain patterns of information consumption. Nevertheless, many participants expressed concern over key aspects of journalistic integrity. Participants also benefited from changes in the information environment, being overall more informed and having greater access to sources and information. However, the report also reflected a background of low trust in journalism and institutions, with little agreement among audience members on the trustworthiness of outlets, institutions, or individuals. Accordingly, the authors add to recommendations, such as Egelhofer and Lecheler's (2019), that institutions need to rebuild audience trust to address the problem of fake news. Egelhofer and Lecheler (2019) recommend investigation of constructive journalism, a new approach which looks, among other things, to broaden the scope of journalism by increasing diversity, context, and balance between positive and negative content in reporting, as a potential way to rebuild trust in news media and institutions, and to draw a clearer distinction between genuine journalistic and pseudo-journalistic content.

Constructive journalism has also been suggested as a response to news avoidance, commonly attributed by consumers to feelings of helplessness and negative mood (Newman, Fletcher, Kalogeropoulos, Levy, & Kleis Nielsen, 2017). Skovsgaard and Andersen (2020) suggest news avoidance[19] needs addressing by news organisations and journalists, with interventions and

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[19] Skovsgaard and Andersen (2020), in reviewing the news avoidance literature, distinguish between intentional and unintentional news avoidance. Intentional news avoidance, in which people make an active effort not to consume news, is often reported in response to a perception of the news as too

changes looking to reduce negativity, increase trust and credibility, and decrease audience fatigue. As news avoidance is related to uninformed views, or reliance on dubious information sources (Strömbäck et al., 2020), I investigated constructive journalism in the context of misinformation; as a response to decreasing news trust, increasing news avoidance, and concerns of news as misleading through over-reliance on negativity and under-utilisation of context.

1.5 Constructive journalism

Constructive journalism has been suggested to build trust in news media (Egelhofer & Lecheler, 2019), decrease the mental health consequences of news viewing (McIntyre & Gyldensted, 2018), and address concerns of bias and negative mood; common reasons for news avoidance (de Hoog & Verboon, 2019; Skovsgaard & Andersen, 2020). Similarly, to respond to criticisms of objectivity, declining levels of trust in journalism, changes to the traditional journalistic structure, globalisation, and increasing polarisation (Hermans & Drok, 2018; Mast, Coesemans, & Temmerman, 2018). Where existing misinformation interventions primarily aim to reduce the quantity of misinformation and frequency of its belief, constructive journalism proposes addressing broader problems of misinformation spread; looking to increase trust, reduce polarisation, and increase information quality. Constructive journalism also responds to a less emphasised factor in misinformation; that of audience dissatisfaction with the quality and accuracy of existing information (Kleis Nielsen & Graves, 2017).

Constructive journalism is a relatively new approach with increasing use and interest among newsrooms, researchers, and journalism professionals over recent years; predominantly among European countries such as Germany, Denmark, the Netherlands, Norway, and Sweden,

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negative; as biased or untrustworthy; or to a feeling of news overload. Constructive journalism is suggested to address intentional more than unintentional news avoidance.

though prominent newspapers such as *The New York Times* and *The Guardian* have also incorporated constructive aspects into their reporting (Meier, 2018). Constructive journalism arose from criticisms of traditional journalistic practices, including sidelining of citizens in political processes, top-down approaches to communication, excess negativity, alienation of the public, and notions of objectivity and journalists as detached observers (Hermans & Drok, 2018). Constructive journalism has multiple schools of thought, but central tenets of the approach include the inclusion of positive angles, developments and potential solutions, and provision of hope and encouragement (Meier, 2018). Three of the main approaches to constructive journalism are delineated briefly below.

Drawing on behavioural sciences to form an evidence base, Gyldensted's (2015) approach to constructive journalism views the journalist as actively involved in creating representations of reality, rather than observing and reporting in a detached manner (McIntyre & Gyldensted, 2017). Particular to Gyldensted is the application of positive psychology to news reporting, intending to uphold the core principles of journalism, including to discuss issues of societal relevance, to disseminate information and issues of importance to the public, to act as a watchdog, and to adhere to an accurate view of the world (McIntyre & Gyldensted, 2017). This view emphasises balanced coverage as including opportunities as well as threats. Glydensted draws on the PERMA model, including positive emotion, engagement, good relationships, meaning, and achievement. Included here is the "sixth W"; the question "what now?" which encourages a future perspective (Gyldensted, 2015). Gyldensted's (2015) constructive journalism also emphasises the capacity of journalism to positively impact audiences and society.

Where Gyldensted (2015) views the journalist as active and focuses on the effect of journalism on audiences, Haagerup (2017) has a more traditional view of the journalist and places

greater focus on editorial and reporting choices. Haagerup's (2017) approach draws on Rosling's et al.'s (2018) idea of 'factfulness' (see Section 1.3.1). Haagerup's approach also places greater emphasis upon context in news reporting; in particular, providing context to facts and statistics, and the inclusion of solutions in reporting (Haagerup, 2017). Constructive journalism is thus seen as responding to criticisms of objectivity by providing "the most obtainable version of the truth" (Haagerup, 2017, p. 16).

While distinct from constructive journalism, which includes broader elements such as greater context to reporting, solutions reporting is often conflated with constructive journalism, and predominant in United States conceptions of constructive journalism (Meier, 2018). This school of thought discusses the inclusion and reporting of solutions within news stories, with an emphasis on maintaining the quality and rigour of general journalism, including reporting limitations.

While similarities exist across conceptions, Glydensted's (2015) approach predominantly focuses on news' impact on audiences, and positive emotions and empowerment, Haagerup's (2017) on correcting large-scale false perceptions of the world, and solutions-reporting on responses to problems. Efforts to consolidate different schools of constructive journalism include six main techniques: solutions; a future orientation; inclusiveness and diversity; empowerment; context ('the Rosling'); and co-creation (Hermans & Gyldensted, 2019).

Constructive journalism approaches may benefit the public sphere and democratic practices, particularly as polarisation and news avoidance increase (Hermans & Drok, 2018). Meier (2018) discusses the benefits of constructive journalism at the micro-level, positively influencing the emotions and worldview of consumers, the meso-level, increasing loyalty to, and presumably trust in, media companies, and the macro-level, encouraging overall societal progress

and engagement. In the context of misinformation, constructive journalism holds theoretical promise for addressing some factors contributing to its spread and belief; including reducing macro-level contributors such as cynicism toward institutions and news providers, polarisation, and broad misconceptions. At a micro-level, constructive journalism could reduce or correct inaccurate worldviews that might lead individuals to believe or more easily accept misinformation as true (Haagerup, 2017). Building on the process of Bayesian updating reported in Section 1.3.2, more accurate worldviews would theoretically reduce the extent to which misinformation aligns with, and accurate information has to fight against, pre-existing beliefs, and thus lend greater weight, and credence, to accurate information (Tappin, Pennycook, & Rand, 2020). Similarly, through reducing negative emotion and the portrayal of extremist views, constructive journalism could reduce individual motivation to share or believe misinformation for emotion or identity-based reasons, such as fear, anxiety, anger, or perceived polarisation, comparative to prototypical or sensationalist reporting (Brady et al., 2020; van Bavel et al., 2021).

A difficulty for constructive reporting is that news consumers, particularly politically interested consumers, often choose to consume negative news reports over positive ones, despite reporting a preference for the latter (Baden et al., 2019; Trussler & Soroka, 2014). The longer duration of negative emotion, and the role of journalism in identifying threats, exposing corruption, and promoting healthy scepticism, also suggests a greater impact of negative news (Trussler & Soroka, 2014). As demonstrated in adages such as "bad news is good news", "no news is good news", and "if it bleeds, it leads", negativity has been characterised as a central, and even essential, aspect of news (Haagerup, 2017; Trussler & Soroka, 2014). However, negativity can also lead to apathy, cynicism, and reduced political participation (Baden et al., 2019; McIntyre & Gyldensted, 2017). Similarly, given the prevalence of negative mood in explanations of news avoidance

(Skovsgaard & Andersen, 2020), negative news, while more immediately arresting, may be less sustainable for audiences.

Constructive journalism serves to address the negativity bias in news by reframing news reports to be positively valanced and solution-focused (Baden et al., 2019). In so doing, constructive journalism holds potential to improve trust in journalistic reporting and accuracy, and to reduce misperceptions (Haagerup, 2017). Constructive journalism also responds to criticisms of objectivity, with McIntyre and Gyldensted (2017) considering constructive reporting a responsible use of paradigm shifts that emphasise information as constructed. They argue constructive reporting is grounded in events occurring within the world, but reports with greater awareness and more ethical consideration of the presentation of information, and that presentation's impact on audience responses and on shaping future world events (McIntyre & Gyldensted, 2017).

Overall, constructive journalism holds potential to mitigate the spread of misinformation, taking into account the effect of reporting upon consumers, and looking to bolster trust in reporting and information (Egelhofer & Lecheler, 2019; McIntyre & Gyldensted, 2017). Though needing further investigation and evidence, the focus of constructive journalism upon diversity, context, and depolarisation may be beneficial in addressing broad misperceptions, and communication norms underlying engagement with (mis)information in the public sphere. Constructive journalism is also well poised as a journalistic intervention. As previously iterated, the approach has gained interest and use in a range of international and prominent newsrooms and among journalists (Meier, 2018). As constructive journalism has been organically generated by journalists and is being actively employed by news media professionals, understanding its potential benefits in the context of misinformation can help understand the extent to which it achieves its promised influence, and contribute to its ongoing implementation if so.

1.6 Other approaches and interventions to combat misinformation

While I focused on constructive journalism as an intervention to reduce misinformation in this thesis, as misinformation is a complex and multi-faceted problem its mitigation is unlikely to be solved by a single solution. Accordingly, I discuss other approaches to reducing misinformation spread and belief below, though their coverage is relatively brief, not being central to the thesis.

Prominent responses to misinformation include digital and media literacy interventions, which, along with 'inoculation' strategies, use the rationale that prevention is better than cure. Such efforts include providing warnings of misinformation; experiments finding them to reduce reliance on misinformation, and increase receptivity to corrections (Ecker, Lewandowsky, Swire, & Chang, 2011; Ecker et al., 2010). Similarly, educating and encouraging greater media literacy and skills for critical assessment of information, including slowing down, considering the source, its funding, expertise, and motivations, and cross-referencing information, have been used to reduce belief in misinformation (Kozyreva, Lewandowsky, & Hertwig, 2020). Many government initiatives have implemented such interventions (Funke & Flamini, 2021).

Under the umbrella of digital literacy, inoculation interventions use the metaphor of a vaccine and cognitive antibodies. Such interventions expose people to exemplar misinformation, or a game where they create fake news, intended to increase awareness of techniques used by misinformation producers and thus critical thinking and discernment of real-world misinformation (van der Linden, Leiserowitz, Rosenthal, & Maibach, 2017). Inoculation has reduced belief in misinformation in experimental and longitudinal studies (Basol, Roozenbeek, & van der Linden, 2020; Maertens, Roozenbeek, Basol, & van der Linden, 2021; van der Linden et al., 2017), and have been made scalable by integration into cartoon and game formats (Cook, 2020; J. Roozenbeek & van der Linden, 2019).

Another prominent response to misinformation is fact-checking, often consisting of purposely published pieces assessing a fact or claim. Meta-analyses have found positive and significant effects of fact-checking on correcting beliefs, however, effect sizes are highly contingent on various factors (Chan, Jones, Hall Jamieson, & Albarracín, 2017; Walter, Cohen, Holbert, & Morag, 2020; Walter & Murphy, 2018). User evaluations can also be effective in fact-checking. While not as effective as organisations or institutions when examining corrections by the Centre for Disease Control compared with lay users, user evaluations had the dual benefit of reducing misperceptions and encouraging accuracy in others (Becker, Porter, & Centola, 2019; Vraga & Bode, 2017). The average rating of 10 politically balanced laypeople was found to correlate with fact-checkers as much as fact-checkers did with one another, suggesting a wisdom of the crowds approach to fact-checking may be a feasible way to scale misinformation flagging (Allen, Arechar, Pennycook, & Rand, 2021). Pennycook and Rand (2019) suggest a similar process for evaluating news quality.

Akin to fact-checking is debunking; or corrections of believed myths and false information (Lewandowsky et al., 2020). Previously, concern about backfire effects, or the tendency for participants to reinforce rather than update their beliefs following the correction of misinformation, particularly political misinformation (Nyhan & Reifler, 2010), led to suggestions to avoid repeating myths when debunking (Cook & Lewandowsky, 2011). However, in a series of five experiments testing a variety of explanations and examples across the political spectrum, little evidence was found for the backfire effect (Wood & Porter, 2019)[20]. Accordingly, there is now

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[20] Explanations for the backfire effect include increased fluency by repetition of the false statement, and active opposition by the recipient, for example by way of politically motivated reasoning or the confirmation bias. However, as Wood and Porter (2019) postulate, backfire effects require some effort on

little concern about repeating myths when debunking (Lewandowsky et al., 2020). However, debunking is best focused on highly prevalent myths to optimise use of resources and avoid undue popularity for obscure myths and conspiracies. While debunking can be effective, where feasible, discussing a different narrative, such as highlighting a vaccine's success, may be more effective than debunking myths.

Media literacy, fact-checking, debunking, and inoculation show promise in improving discernment of (mis)information, however, they are subject to some pragmatic limitations. Such interventions require motivation, time, and mental energy from individuals to engage with them. Where individuals are not motivated to be accurate or distrust the providers of media literacy material (likely the population most in need of such interventions), these interventions may be less effective. Similarly, fact-checks are more likely to be viewed by those with relatively higher digital literacy, who are willing and motivated to form accurate beliefs. While fact-checks may be effective at reducing misperceptions among these populations, they are less likely to reach those most vulnerable to encountering and believing misinformation. Fact-checks are also limited in that they always follow after misinformation.

Other responses to misinformation have focused on changing social media platforms. Among these are accuracy nudge interventions, which involve short reminders to consider

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the part of participants, as they typically involve a level of intellectual assessment of the facts and arguments presented. By contrast, adherence to an ideologically-focused group identity may allow the acceptance of corrected information, without changing overall attitudes and preferences. Wood and Porter (2019) therefore suggest backfire effects may be influenced by survey wording and may also be more common among university student participants who are more inclined toward cognitive effort. Overall, the authors suggest political facts themselves to be seen as relatively banal, and therefore easily updated, though underlying attitudes may be more resistant to change.

accuracy before sharing (Pennycook, McPhetres, Zhang, & Rand, 2020). Pennycook et al. (2020) found accuracy prompts to improve discernment and reduce sharing of false headlines. While effect sizes are small, the relative ease of implementation makes accuracy prompts a promising intervention (Pennycook et al., 2020). However, the possibility they may encourage excessive scepticism toward true information requires further research.

Other changes to platforms include the removal of misinformation and 'bad actors', bots or users responsible for proliferating false or polarising content to manipulate public opinion (Van Bavel et al., 2021). Similarly suggested are changes to incentive structures, primarily on social media, to reduce the promotion of false and divisive content (Van Bavel et al., 2021). Similarly, Formosa (2020) argues that forming incentive structures for leaders and institutions which encourage and reward good conduct will contribute to more ethical political systems, and improve trust. Changes to social media platforms, such as accuracy prompts, removal of bad actors, and changes to incentive structures, offer useful responses to misinformation. However, a key consideration remains the balance between reducing polarisation and misinformation, and maintaining freedom of speech and information. Again, the above interventions are not a central focus of this thesis, however, they provide a background to the testing and implementation of constructive journalism, as an organically developed approach to address concerns of the influence of news media, both positive and negative, in misinformation.

Chapter Two: Methodological Framework

The following chapter outlines the underlying theoretical framework I used to explore news media and constructive journalism in relation to misinformation, including the epistemological position and methods. First, I outline the critical realist epistemological position I adopted and the systems thinking framework I used to conceptualise the problem of misinformation. I then elaborate how distinctions were made on the truth of information. Following the definition of misinformation used throughout the work, I overview the trajectory of the thesis, including the rationale for shifting focus from cognitive theories of belief in misinformation to news media, and the rationale for the methods used in each study. The chapter finishes with an overview of the rationale for using both Bayesian and Frequentist statistical paradigms.

2.1 Epistemological position: Critical realism

I conducted the thesis work from a position of critical realism. Critical realism posits that while there is an existing and objective reality, our ability to perceive and understand it is limited by the bounds of human perception and methodology. As noted in the introduction, academic thought has increasingly seen a divide between modernist and postmodernist thought. Broadly speaking, the modernist perspective is characterised by the claims of logical positivism, that through rigorous collection and analysis of empirical data we can produce objective statements about the world as it exists. On the other side are constructionist approaches, which claim that objectivity is precluded by the processes of socialisation and culturation which prevent the possibility of a neutral starting point, and therefore the production of any truly objective data. Such a description is of course brief, and there is considerable argument behind these positions (see for example Braun and Clarke, 2013; Danermark, Ekstrom, Jakobsen, Karlsson, and Bhaskar, 2001)

that are beyond the scope of this thesis. The critical realist view I adopt arose partially in response to the schism between the positivists and the postmodernists.

Critical realism looks to integrate the notion of an ontology or world that is separate from human perspective, with an epistemology or way of knowing that is unable to transcend that perspective (Danermark et al., 2001). Critical realism accepts that our perception of phenomena and events is shaped by assumptions influenced by broader individual, social, and cultural influences, consistent with social constructivist approaches (Danermark et al., 2001). However, these phenomena and events exist and occur outside of our perceptions. Our perceptions and assumptions of them can therefore be calibrated by gathering and examining evidence, in a manner similar, though less extreme, than that proposed by logical positivism. In particular, critical realism draws a distinction between the ontology of the world, or the notion that the world as it exists is separate from ourselves, and the epistemology, or way of knowing about the world, which is influenced by our assumptions and experiences (Danermark et al., 2001). In other words, critical realism takes a realist ontology, and a relativist epistemology, as demonstrated in Figure 7 below.
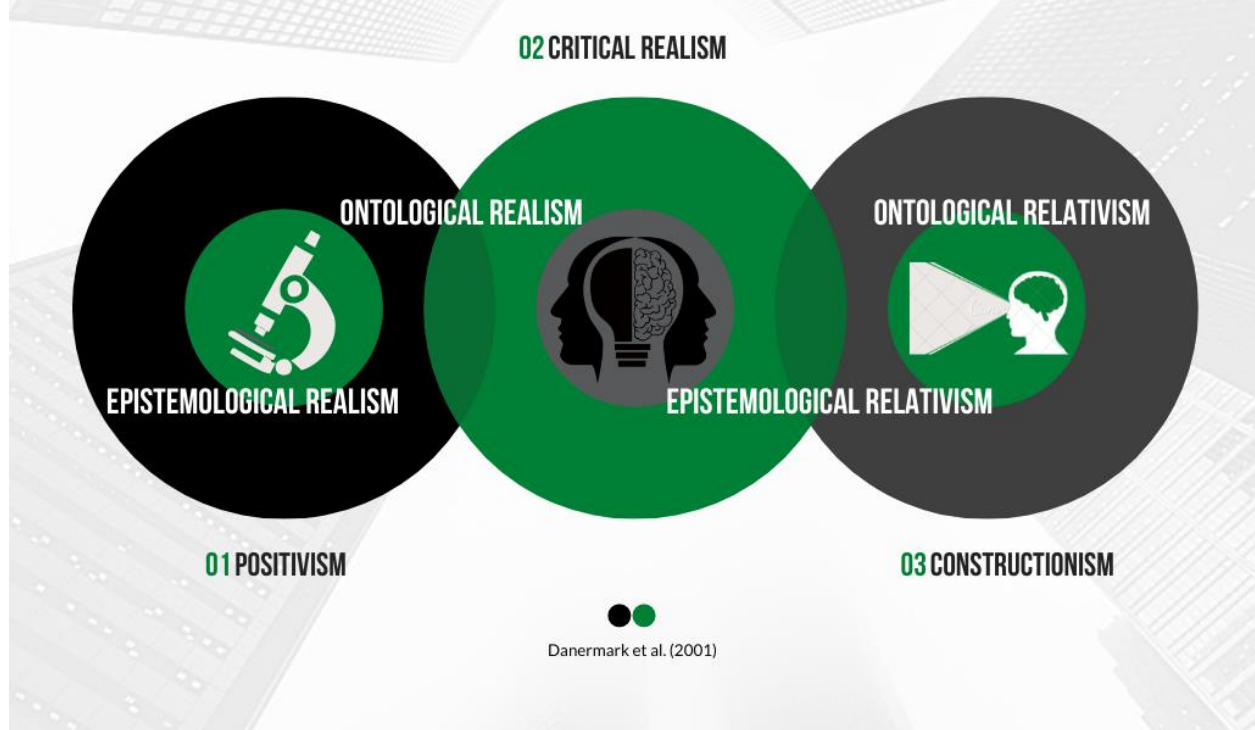
Figure 7. There is a schism between positivism, or the idea that we can generate objective knowledge about an objective reality, and constructionist approaches, or the idea that we cannot objectively access reality, and that reality cannot be disentangled from (subjective) perception. Critical realism looks to resolve this schism by taking a realist ontology and a relativist epistemology.

The literature on critical realism contains considerable discussion on the structure of reality/events, and the structure of epistemology and methodology through which we ascertain knowledge of those events and the mechanisms which cause them (Bhaskar, 1989; Danermark et al., 2001). Such literature also considers how our epistemology combines with the structure of reality, and the consequences of these differing structures and their interactions (Bhaskar, 1989; Danermark et al., 2001). Given the focus on misinformation and news media, I do not overview

all aspects of critical realism, such as ontological domains of reality, the process of abstraction, or the concept of a stratified reality. I do however expand on the distinction between transitive and intransitive states of science, open and closed systems, the role of the observer, the abstractions generated in the knowledge-making process, and how these in turn influence the systems and reality they seek to understand. Following this discussion, I comment on critical realism as it pertains to investigating the spread and belief of misinformation, including critical methodological pluralism and misinformation as an interdisciplinary problem.

2.1.1 Intransitive and transitive aspects of science

Critical realism makes a distinction between the transitive and intransitive states of science. The intransitive refers to the world which is, and the phenomena and mechanisms which occur, regardless of our observation or understanding of them. Conversely, the transitive refers to the body of theories and knowledge accumulated through scientific and academic pursuit, which are observer dependent. Effectively, we see a distinction between reality (the intransitive) and knowledge (the transitive). While effective science provides knowledge which is constrained by reality, it is nevertheless separated from that reality. Or, as Danermark et al. (2001, p. 40) describe it "Scientific observations and theories are thus always concept-dependent but not concept-determined." In essence, our concepts and theories are shaped according to the data we collect, which are in turn constrained by reality as it exists. However, which questions we ask, and thus which answers we receive, are influenced by our pre-existing conceptions and theorising.

The position of intransitive and transitive aspects to science presents a similar view to constructionist critiques, which refute the modernist idea that we can achieve 'ultimate' truth. However, unlike many such critiques, critical realism suggests we can have better knowledge of events and mechanisms within the world. While theories may never be 'True' in an objective sense,

where they are developed well, they can achieve a better approximation of reality. Theories in science are thus not True knowledge, but the best knowledge we are able to ascertain at the present time. Critical realism also shares similar criticism to constructivist approaches here in recognising science as a social endeavour, that is shaped by the influence of social mechanisms, including cultural, political, and economic conditions (Kuhn's, 1970, theory of scientific revolutions is often cited here). Similarly, critical realism posits that the communication and often conceptualisation of scientific concepts and theories is bounded by language, which places constraints on the ideas which can be communicated and conceived. However, critical realists once more refute that this presents an inability to have better or worse theories. While there is an ontological gap between the world as it is and the world as understood by current theory, theories are nevertheless subject to the (intransitive) reality of the world, and therefore also shaped in accordance with something beyond themselves.

Critical realism therefore posits practical relevance as a criterion by which the appropriateness of theory and knowledge, and its applicability to the real world, can be judged. Here, Danermark et al. (2001) draw a distinction between instrumentalism, cognitive relativism, and critical realism. While the latter draws on useful concepts and criticisms made by the former two positions, it does not take the view that all knowledge is relative, or true only where it becomes useful to someone. Rather, as Danermark et al. (2001) note, the closer a theory or knowledge is to capturing the generative mechanisms at play, the more useful it will be. However, it is also important that this usefulness be evaluated in the appropriate context, as knowledge may be accurate without being able to assist everyone equally.

In the context of misinformation and research on it, the relevance of critical realism's transitive and intransitive domains are twofold. On the one hand, in the context of theory, critical

realism provides a useful critical lens, acknowledging that while theories can better approximate reality, they are nonetheless bounded in their capacity to do so and are refined by continual updating based on new evidence, including evidence of their practical utility. On the other, critical realism is also useful when defining misinformation, as rather than making definitive statements of the Truth or falsity of a claim, which could be open to dispute, within a critical realist framework misinformation can be defined as that which denies claims established on the best current evidence.

2.1.2 Open and closed systems

A key distinction in critical realism is that of open and closed systems. In essence, closed systems refer to conditions in which generative mechanisms can operate in isolation, and thus in predictable ways not influenced by other mechanisms; akin to those intended to be approximated in an experiment[21]. Closed systems have two criteria: the internal condition for closure is that the objects within the system do not change or vary in a qualitative way, as this would alter the mechanisms. The external condition for closure is that the relation between causal mechanisms and environmental mechanisms must be constant, for the outcome to remain regular (Danermark et al., 2001, p. 67). In closed systems, there are no emergent powers[22], and new mechanisms do not develop, allowing the possibility of regularity, and thus, prediction. By contrast then, open systems are those in which objects change, or external and environmental conditions change, such that emergent properties are possible, as is the possibility of new or altered mechanisms.

However, proponents of critical realism also propose that closed systems are not (or at least, have a very slim possibility of being) produced by nature, though phenomena in lower

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[21] Danermark et al. (2001) refer to experiments as an attempt to artificially close a system.
[22] Referring to outcomes which occur through the interactions of many parts or mechanisms within a system, and which do not follow linearly from those parts or mechanisms – in essence, the whole (emergent property) is greater than the sum of the parts.

strata[23] may closely approximate closed conditions (e.g., within physics, or phenomena such as the solar system). The question of open vs. closed systems is thus less of a binary classification, and more a matter of spectrum or gradation. The question is not whether a system is open, but how open. Danermark et al. (2001), note that the higher the strata of a phenomena, the greater the possible number and combinations of mechanisms, and thus the greater the possibilities for emergence. In relation to research, the question of whether a system in interrogation is open or closed (or how open) has ramifications for the methods of study and the type of knowledge generated. The more closed a system, the greater the ability to conduct repeatable linked observations/measurements. The more open, the harder to link stimuli, observation and measurement, and thus the need for a wider range of methods and measures to understand the system or phenomenon. In the context of misinformation and news media, the primary domains of concern are social and psychological, and the system in question is more open than closed, requiring a broader array of methods, as covered in further detail below.

2.1.3 Critical realism and misinformation

Building on the idea of the stratification of reality, and on open and closed systems, critical realism raises a key issue in relation to misinformation; namely that social and psychological phenomena, such as the spread and belief of misinformation, occur at a high stratification and within an open system, in which both the objects of study and the conditions in which they operate are subject to continual change. Misinformation and constructive journalism are investigated with reference to both psychological and social systems, and thus the difficulties of both must be considered. As, under a critical realist framework "our claims on knowledge and on methods must

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[23] While I do not cover the stratification of reality in this chapter, it may help to note here that the order proposed by Bhaskar (1989) goes from physical, to chemical, to biological, to psychological, to social; with each strata building on those below, in addition to having its own causal mechanisms.

be adapted to the nature of the object we study if knowledge is to have practical relevance" (Danermark et al., 2001, p. 70), a problem situated in open systems, such as that of misinformation and news media, requires a "critical methodological pluralism" (p. 152).

Critical methodological pluralism refers to the need and recognition of the value of applying multiple methodologies when investigating a phenomenon; though doing so with consideration for the methods best fitting to the phenomenon, and with a critical awareness of what knowledge such methods can generate within the ontological context of the object investigated. In practice, this means the methods are chosen considering the degree of openness in the system and the knowledge possible given this openness and the strengths and limitations of each method. In particular, critical methodological pluralism suggests the recognition of the benefits of both qualitative and quantitative methodologies, and the implementation of both where it befits the object of study.

Also important to the study of misinformation from a critical realist point of view is that human beings have agency; thus, they are able to respond to and adapt with a system. Additionally, our knowledge of misinformation and its mechanisms becomes a component of the system, which can also be adapted to and itself alter mechanisms of causation. In the case of misinformation, a critical realist approach therefore leads to the use of methods which are able to uncover the mechanisms and relationships at play within the spread and belief of misinformation, and also recognises how circumstances may shape the functioning of such mechanisms and relationships, and how perceptions may also shape the phenomena.

2.2 Methodological framework

I employed a range of methods consistent with the critical methodological pluralism proposed above, to understand and investigate the influence of news media in the spread and belief

of misinformation. These methods included non-experimental survey research, qualitative interview research, and experimental research. Coming from a position of critical realism, a range of approaches also works to broaden the lens through which phenomena may be viewed, allowing a more complete (though still limited) picture of the reality of a phenomenon, in this case, constructive journalism and misinformation. Use of a wide range of methods has also been recommended in psychology research to better understand complex and interrelated phenomena, such as misinformation (Northcott, Diener, Zyphur, & West, 2021).

While critical methodological pluralism mainly refers to the use of both qualitative and quantitative methodologies, the focus of the argument for critical realism and methodological pluralism is again that the methods must be chosen in accordance with the subject being studied. Social and psychological phenomena, such as how people respond, react to, and perpetuate misinformation in mass media, occur within open systems, and operate at multiple levels of reality stratification[24]. These phenomena are in turn influenced by the lower levels of reality stratification, and thus necessitate a range of methodologies which are able to address the unique contributions of mechanisms at varying strata.

As a complex problem, misinformation and its spread and belief are also interdisciplinary. While social and cognitive psychology can assist in explaining how and why people believe and share misinformation, their explanations also benefit from integration with other disciplines which address structural, biological, and societal influences in responses to misinformation. These

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[24] This occurrence across multiple levels or strata of reality can be seen in misinformation research, with some authors using physiological measures to explain responses to misinformation or processes behind news selection and motivated cognition (see for example Boyer, 2021; Soroka et al., 2019), while others explain misinformation transmission in terms of individual psychological explanations (e.g., at the level of cognition), social and group explanations (e.g., norms and group identity), and technological explanations (such as algorithmic selection and filter bubbles), to name a few (Van Bavel et al., 2021).

disciplines include but are not limited to political sciences, communication sciences, journalism, sociology, philosophy, and computational social science.

Critical realism has been suggested as a useful position from which to approach interdisciplinary research, enabling a separation of reality across multiple levels without invoking contradictory philosophical underpinnings (Danermark, 2019). Similarly, the stratification of reality described in critical realism recognises and provides a useful way to integrate the knowledge from various disciplines, such as those listed above, into a cohesive whole; understanding that the different strata may impact upon one another, while also having properties unique to themselves, and therefore requiring of a separate set of approaches and methodology. In the context of misinformation and constructive journalism, as interdisciplinary areas with research conducted across a variety of fields, including but not limited to psychology, political science, communication science, sociology, and computational social science; critical realism provides a useful framework to approach and understand findings from a variety of fields in response to different aspects and scales of the misinformation problem. For example, combining findings which address the technological, institutional, social/group, identity-based, cognitive, and emotive aspects of responses to and interactions with misinformation.

Critical realism is also well-suited to a systems thinking framework (Mingers, 2011), for understanding complex and interdisciplinary problems, such as the problem of misinformation.

2.2.1 Systems thinking

While critical realism has informed the methodological approach I have taken, systems thinking[25] has informed how I have scoped problems of misinformation and potential solutions

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[25] Though complex systems/complex adaptive systems technically form a subsection of systems thinking, for the sake of conciseness, in the thesis I use them interchangeably with systems thinking and include them in the general discussion of the approach.

such as constructive journalism. Traditional scientific approaches commonly examine problems in the context or under the presumption of complicated systems which, much like an engine, consist of multiple parts that work together to produce an outcome, and whose interactions and their outcomes can be mapped and understood given sufficient tools, time, and effort. Such an approach, often attributed to the derivations from the works of Newton and Descartes (Hammond, 2005; Poli, 2013), takes a deterministic view of the world. By contrast, systems thinking is concerned with complex systems, which consist of a broad range of dynamic, adaptive, and non-linear relationships (Meadows & Wright, 2009). While complicated systems can be understood and therefore used to draw accurate predictions, complex systems have emergent properties; while patterns can be identified and used to estimate potential outcomes, chains of cause and effect are subject to changes and fluctuations which shape the outcomes of a system. (Similar to the discussion of closed and open systems in critical realism).

A key aspect of systems thinking is that small changes in the attributes, elements, or relationships within a system can have a large impact on the resulting outcomes, including creating outcomes which were unlikely to be considered by people observing, shaping, or interacting with the system (Meadows & Wright, 2009). However, this notion also leads to the observation of leverage points in a system, or aspects of the system which can cause large changes from relatively small interventions. In the case of problem-solving using systems thinking, identifying and manipulating these leverage points can be an effective way of wrangling better outcomes (Meadows & Wright, 2009).

Systems thinking approaches have been receiving increased attention, including within psychology and related disciplines (Bak-Coleman et al., 2021; Han & Lang, 2020; Kern et al., 2020). However, a key criticism of systems thinking is its practical implementation (Cabrera,

2012), due to which the implementation of systems approaches often remains conceptual. I primarily use systems thinking as a way of conceptualising the relationships and dynamics involved in concerns of constructive journalism and misinformation, particularly where they interrelated with social psychology, cognition, and news media. As previously noted, at present there is not a singular theory which explains the belief and sharing of misinformation (Van Bavel et al., 2021). Given this work spans across psychology and journalism, the use of systems thinking enables the integration of multiple theoretical and disciplinary approaches when conceptualising the problem of misinformation. While methods to investigate dynamic models are being developed (Northcott et al., 2021), within the current thesis systems thinking was used to scope and understand the phenomena of focus, rather than providing specific hypotheses to be tested and investigated.

A key feature of systems thinking is the drawing of systems maps, including feedback loops which can be reinforcing (where relationships feed off each other such that an increase in one element increases the other and so on, or a decrease causes a decrease in the other and so on), or balancing (where the elements balance each other out, such that an increase in one results in a change in the other element to bring a neutral effect). I created a systems map for misinformation belief and spread, presented in Figure 8 below. While this map is largely conceptual, its key purpose is to conceptualise various dynamics influencing misinformation belief and sharing. The map was created as part of a systems thinking course with BehaviourWorks Australia, drawing on reading of the literature to integrate various aspects and factors contributing to the phenomena of misinformation, as indicated by the key alongside.
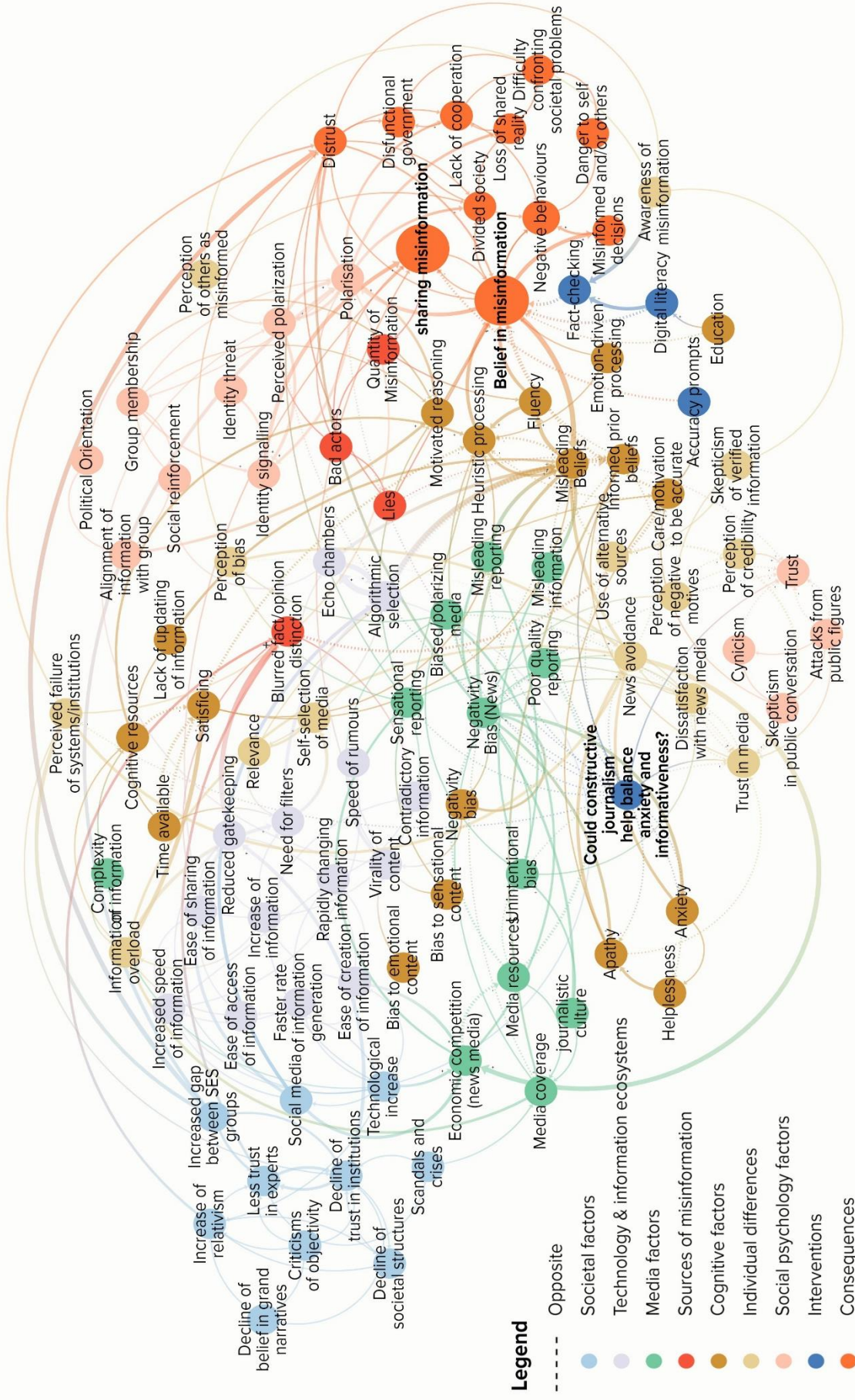
Figure 8. Working systems map of misinformation belief and spread. The systems map was used as a conceptual tool to illustrate the influences and relationships between societal, technological, media, social, and cognitive factors in the literature on misinformation spread and belief. I have made this map freely available at: https://kumu.io/Tarsha-vA/mipt#thesis-systems-map.

An example of criteria for assessing whether a problem is fitting to a systems thinking approach versus a complicated systems approach is demonstrated in Figure 9 (Omidyar Group, 2017). Comparison of these criteria to misinformation suggests a systems thinking approach is fitting. Misinformation, while better understood than it has been, is still subject to variations in definition. The scale of the problem, as well as its solutions, are debated, and both are intertwined in complex ways with the broader global, national, and local environment. The aim in addressing misinformation, while also having a short-term element, is to cause large-scale change. Accordingly, a systems thinking approach befits the issue.
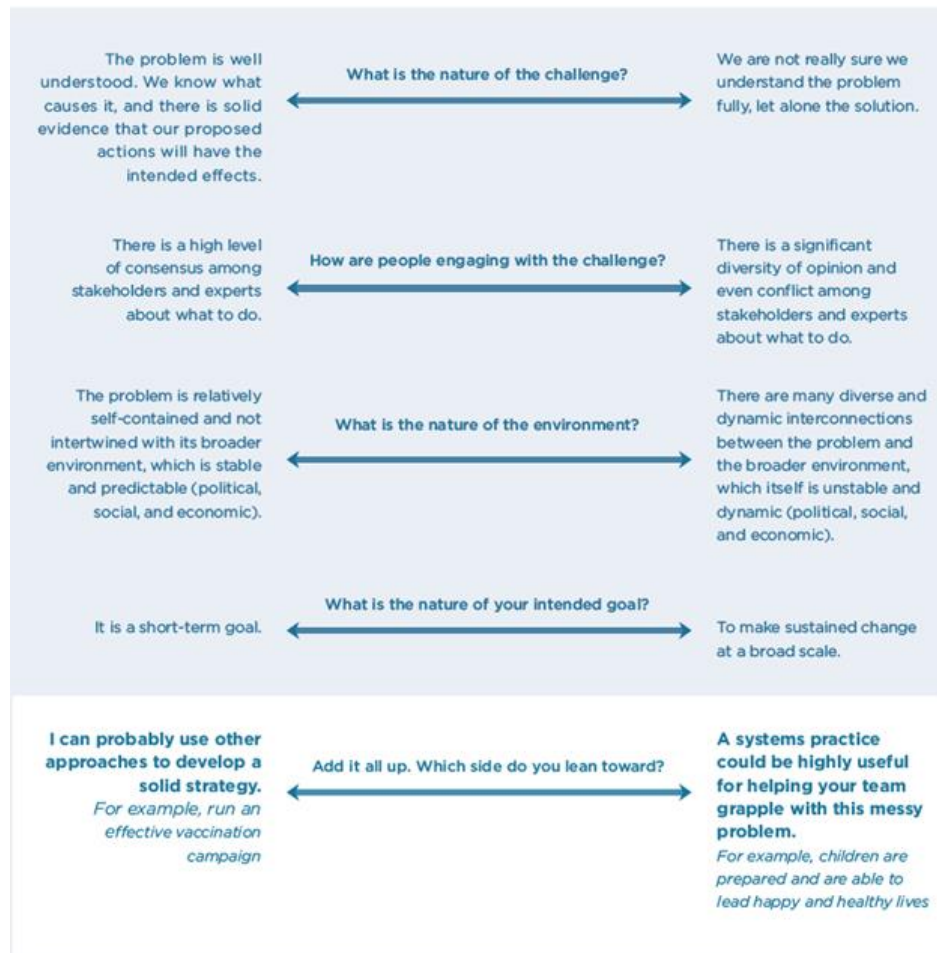
Figure 9. Criteria for assessing whether a systems thinking approach is fitting to a problem (Omidyar Group, 2017).

Systems thinking is primarily useful in the context of long-standing and seemingly intractable problems. Accordingly, systems thinking approaches rarely purport to find solutions which eradicate problems; rather, they look to manage them in ways which encourage better outcomes, with the recognition that some problems will require continual calibration of the system, and that new problems, or new forms of the problem, will arise as the system adapts. For this reason, working within a systems thinking framework is often described as 'dancing' with the system, not fixing or resolving it (Meadows & Wright, 2009).

Recent calls have been made for the inclusion of systems thinking and complex adaptive system approaches in conceptualising human behaviour in the Anthropocene, particularly in relation to issues such as global stewardship (including stewardship of information) and sustainability (Bak-Coleman et al., 2021; Schill et al., 2019). The use of systems thinking, particularly as discussed by Meadows and Wright (2009) has also been proposed in conceptualising and responding to misinformation. Proposed benefits of doing so have included reducing unexpected negative outcomes from interventions, including reducing negative impacts on the credibility of news media (Ammara, Bukhari, & Qadir, 2021).

Systems thinking approaches address behaviour as occurring due to multiple levels. At an individual level, people engage in decision-making as quasi-rational beings with limited access to information. These individuals are also embedded in an immediate environment, including social and physical attributes which influence decision-making and behaviour. Within these immediate environments, individuals are interacting with other culturally embedded and quasi-rational agents in ways which again influence decision-making and behaviour. Through these interactions, multi-scale and multi-level structures emerge, which in turn influence decisions and behaviour, and are in turn influenced by them in an ongoing cycle (Schill et al., 2019). In the context of researching

misinformation, questions similarly address how individuals make decisions on the veracity of information and how these decisions impact (or do not impact) on their beliefs and sharing of information. Similarly, these interactions with information take place within the context of broader structures and institutions, such as social or news media, which are in turn altered according to the engagement of individuals with them.

2.2.1.1 Systems thinking and critical realism

The relation between systems thinking and critical realism may already be apparent – both draw on similar concepts of emergence, open and closed systems, agency, causal mechanisms resulting from a myriad of influences at different levels which interact in complex ways, and discussions of agency within structures; including the influence of our own theorising on that agency and knowledge. Such similarities have been pointed to by Mingers (2011), who notes critical realism and systems thinking share not only similar concepts, but also similar language, and have much to gain from their combination; a methodological gain for critical realism, and a philosophical gain for systems thinking. Accordingly, I drew on both approaches to guide the conceptualisation of misinformation, and the choice to use multiple methods.

Both systems thinking and critical realism make note of the role of the researcher in knowledge production. In critical realism, the researcher is often discussed in relation to the process of abstraction or theorising, which shapes the conceptual framework from which events and mechanisms are studied (Danermark et al., 2001). In systems thinking the researcher is discussed both as an active observer within the system, and, in defining the boundaries of the system (Meadows & Wright, 2009). Similar to one of the central limitations described in qualitative research, that no two researchers would produce the same themes or codes from the

same data[26], the process of defining system boundaries is likely to vary between researchers. However, this does not mean all conceptualisations are equal. As in qualitative research, there can be some analyses which are of better quality than others, and within both the critical realist and systems thinking frameworks, these can be examined with relation to empirical data.

Systems thinking and critical realism address very similar concepts of relevance to misinformation research. Both are amenable to trans- and interdisciplinary approaches, acknowledge the role of a broad range of phenomena and mechanisms whose causal influences are contingent on a variety of conditions and whose effects and outcomes may be subject to small changes in conditions, and both account for open or complex rather than closed or complicated systems. Similarly, both address concepts of emergence, and advocate for the use of a broad range of methodologies which are chosen with critical thought on the knowledge they can produce given the subject's ontology.

2.2.2 Defining misinformation

A criticism which may be levelled at any thesis on misinformation is that of the postmodern critique previously overviewed; that is, who can say what is true when all claims to truth must be filtered through individual and societal perceptions and capacities? While I do not intend to answer this question in a philosophical sense, for the sake of the work within, misinformation was defined as information which opposed the best available evidence, or which claimed a certainty not grounded in evidence or reasonable supposition. For example, the claim that eating garlic would prevent consumers being infected with COVID-19, while not contradicting existing evidence, lacked evidence or reasonable grounds. Such an approach is not intended to sidestep issues of making claims to truth (or indeed 'Truth'). However, it is in keeping with the epistemological

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[26] Though some forms of qualitative analysis are less subject to this criticism (for example, content analysis with a predefined set of codes in which frequencies are counted).

position of critical realism, which suggests while we may not achieve definitive truth, we can achieve an approximation of reality, and update that approximation in an ongoing process. Some proponents of critical realism have also suggested such approximations to form a necessary basis for much of our social and civic endeavours (Danermark et al., 2001).

2.3 Thesis trajectory

I used a range of methods — quantitative, qualitative, experimental, and observational — to understand aspects of misinformation spread and belief with a focus on the news media. Among these were qualitative analyses of news articles (not presented in this work) and interviews, and quantitative analysis of survey and experimental data. The rationale behind this choice of using a broad range of methodologies was in part due to the thesis topic, as how people share and come to believe or disbelieve misinformation and how the news media combat or facilitate such belief and sharing forms a complex and interdisciplinary problem. While specific methodological choices in the context of each individual study are explained in later sections, these choices relate back to how I have conceptualised and operationalised core constructs such as misinformation and constructive journalism, which has developed over the course of the thesis.

Initially my thesis was grounded predominantly in cognitive psychology, and therefore turned to relevant literature on heuristics and biases, including but not limited to the work of Tversky and Kahneman (1974), as well as work cognitive work investigating belief of pseudo-profound bullshit (Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2015), and feelings of truthiness (Schwarz & Newman, 2017). At the time of starting the thesis, the predominant cognitive theory explaining belief in misinformation was that of motivated cognition (Kahan, 2013; Kunda, 1990). However, theories of cognition and motivated cognition also discussed factors which contributed to information processing, including to no small extent prior beliefs.

Such prior beliefs were often discussed as being influenced by factors such as family, friends, and media, including news media (Tappin & Pennycook, 2021). Alongside this, the initial thesis focus on news media and coverage of asylum seekers and refugees also touched upon misleading and even false portrayals by news outlets. Included in this discussion was the predominantly negative focus of news media, and the suggestion that this could contribute to misinformed beliefs and polarising discussion of refugees and asylum seekers (Wright et al., 2019).

Such discussion drew my attention toward the role of news media in misinformation discussions, with the negativity bias of news media being frequently referenced, and alongside it concerns of news avoidance, apathy, and the mental health cost of news, which could increase anxiety and depression (Boukes & Vliegenthart, 2017). Similarly, frequent discussion of the low levels of trust in news also seemed an apparent concern. In reading literature relevant to misinformation, 'post-truth', and news media, concerns of the quality and negativity of news media were also raised in a mixed methods study on audience perceptions of fake news by Rasmus Kleis Nielsen and Graves (2017), which found participants, while concerned about misinformation and fake news, were more concerned with the quality of the news media and information environment in general. Following these concerns, I looked into the literature on news and mental health, and news trust and news avoidance, including literature addressing "fake news" as a rhetorical device used to discredit genuine journalistic reporting (Egelhofer & Lecheler, 2019). Such exploration led to the thesis focus on constructive journalism, which pointed out that the negativity bias and certain other aspects of journalistic culture led to the news media portraying a filtered view of the world; one which could often be more negative and polarising, and which did not give a realistic indication of developments in societies (Haagerup, 2017). On the converse side of this were studies indicating that people were avoiding or lacking trust in the news for similar

reasons. Some literature suggested approaches such as constructive journalism could be beneficial in encouraging use of and trust in genuine news reports rather than alternative and partisan sources (Newman & Fletcher, 2017; Strömbäck et al., 2020).

Following the onset of the COVID-19 pandemic, concerns about the role and approach of news media seemed relevant to the ongoing crisis, and this led to a study on news media in the context of COVID-19, with a particular focus on anxiety, misinformation, and protective behaviours. As well as the previous discussion on news media, this focus on emotion also stemmed from discussions and definitions of post-truth, which often referenced a greater attention to emotion and opinion than fact and truth. Surprisingly, I had come across relatively little literature, including in reviews of 'post-truth' and misinformation sharing, which empirically addressed this aspect of emotion, despite its prominence in discussions of 'post-truth' and misinformation (with some exceptions, e.g., Martel et al., 2020; Weeks, 2015). As the questions the first study sought to investigate were more fitting to an observational approach, I used a non-experimental design, aiming to have higher external validity, and to provide perspective on how views and misinformed beliefs related to media use in the natural environment.

Concurrent to the first study, I was conducting interviews on constructive journalism and its applications and benefits in the context of misinformation, which was extended to include COVID-19 following the declaration of a pandemic. A qualitative approach was taken to gain an understanding of both the theoretical and the practical side of constructive journalism, particularly as the literature at the time of the study contained multiple explanations of the approach, and few practical guidelines on how it might implemented by journalists. Qualitative research also allowed further insight into constructive journalism and how it was applied and viewed by practitioners in the field, helping to guide quantitative and experimental work on its effects. Consistent with the

overall epistemological position, analysis of the interviews was undertaken from a position of critical realism.

Following the interview study and reading the literature relevant to the previous studies on media use and immigration and COVID-19, the final study consisted of an experiment designed to test the proposed effects of constructive journalism. The literature and work I had conducted to that point suggested constructive journalism to be promising in addressing multiple aspects of misinformation belief and sharing, yet its evidence base was limited. An experimental design was therefore used to test causation, and the hypotheses that constructive journalism would increase trust, decrease negative and increase positive emotion, and affect comprehension. As expanded in this piece, efforts were made to create ecologically valid stimuli, with an aim to balance the internal validity of the study with its real-world applications.

As previously noted, this development was also shaped, at a background conceptual level, by the overarching framework of systems thinking, particularly in viewing the role of media as an institution with far-reaching effects. While recent literature, as discussed in the introduction, has begun drawing greater attention to the role of news media in misinformation, initially public and academic discussion of this aspect of misinformation was relatively limited, and often drew on anecdotal concerns rather than empirical work. In part this may be due to the small effect sizes often found in media research, which can suggest mass media to have a relatively small impact (Perse & Lambe, 2016). Similarly, the predominance of conspiracy theories and misinformation being shared on social media, or being found among those using alternative sources, may have detracted attention from the news media. Taking a systems approach, the small effect sizes of news media nevertheless remain relevant, as a background element which may have vast effects elsewhere in the system, even if the direct and easily measurable effects are slight. Similarly, such

an approach takes into account the influence of multiple factors on the decision to use social media or alternative sources in place of journalism, such as avoiding or not trusting news, which are suggested to extend in no small part from concerns of bias and negativity (Skovsgaard & Andersen, 2020; Strömbäck et al., 2020).

Again drawing on systems thinking, I do not seek to propose constructive journalism as a panacea for misinformation, nor do I look to suggest other work or approaches to combatting misinformation as less important or effective. As a complex problem, misinformation is likely to need a range of solutions, which address its causes and symptoms at multiple levels. As news media appeared to be an important and somewhat understudied aspect of the spread and belief of misinformation, I therefore investigated constructive journalism, as a potential way to alleviate some of the negative contributions and increase some of the positive contributions of news media.

2.4 Statistical methods

I drew on both Bayesian and Frequentist frameworks. While the rationale and detail on the analyses are further explained in each study, I detail the broader rationale for using these different statistical approaches here. In a nutshell, the intent was to apply the methodology most fitting to the aim of each study. A brief overview of both the Frequentist and Bayesian paradigms can also be found in Appendix 1.

Rather than subscribing to one or the other school (Frequentist of Bayesian) rigidly, I used a combination of statistical methods from each School as suggested by Kass (2011), to better tailor analyses to the object of study (See Appendix 1 for more detail on this 'mixed' approach). Berger (2010), writing from the perspective of epidemiology, notes that the Frequentist framework is better suited to experimental designs and direct cause-effect hypotheses, while Bayesian methods are better suited to "hypotheses, conjectures, or public policy goals" (Berger, 2003, p. 583).

Similarly, Williamson (2013, p. 295) notes that the Frequentist school of thought is intended to elucidate "agent-independent features of the world" and concerns the impact of evidence on physical probability functions, while Bayesian methods are more concerned with the impact of evidence on rational belief, and how an agent should act. As such, it is possible to make use of both paradigms depending on the design and goal of the study, with an awareness of what each method presupposes and what knowledge can be gained by each. Both are attempts to test the alignment between the theoretical and the real world (bearing resemblance to discussions of the ontological gap in critical realism), and while they take different approaches and produce different knowledge, both are useful in assessing the extent to which the theoretical and the concrete align (Kass, 2011).

Such calls for a lessening of the schism between Bayesians and Frequentists include calls for a methodological pluralism that better equips us to understand complex phenomena, and to adapt our approach to the object of study; largely akin to the justification for critical methodological pluralism advanced by proponents of critical realism (Danermark et al., 2001; Vallverdu, 2015)[27]. The use of both paradigms was accordingly fitting with the overall perspective I adopted in the thesis, aiming to recognise the strengths of each paradigm, and the knowledge each provides, and to make use of both paradigms according to the aims and object of investigation. As I used both non-experimental and experimental methods, use of both paradigms was also appropriate for investigating the different questions regarding updating beliefs about interactions in a naturalistic setting, and answering questions of causation in an experimental setting.

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[27] The argument for using both paradigms in Vallverdu (2015) includes phrases such as "nature is relational and works at different organizational levels." and "the whole is more than the sum of parts.", reflective of the stratification of reality discussed in critical realism, and one of the stock phrases associated with systems thinking. (It is also noted here that Vallverdu, 2015, argues for Bayesian statistics over the Frequentist paradigm, though recognising the benefits of both).

2.5 Affordances of mixed methods methodological framework

The methodological framework described in this thesis involves the use of systems thinking and mixed methods approaches to investigate misinformation through the lens of critical realism. Mixed methods provide more scope for interdisciplinary research, which takes into account the unique perspectives and knowledge provided by different fields. This diversity of perspectives and knowledge contributes to understanding both the individual causal effects, and the broader systemic factors, that drive misinformation belief and sharing.

While systems thinking and critical realist approaches emphasise the importance of multiple perspectives to provide a more complete understanding of a phenomena, this needs to be coupled with a critical perspective on the limits of different fields and methods, and the knowledge that they provide. In bringing together research across fields, this requires researchers to have an awareness of the limitations and assumptions of their own knowledge, and to also understand what aspect of understanding or addressing the misinformation problem their field contributes to. Researchers should be aware of the strengths and limitations of their research methods and domain to infer causal claims about the mechanisms underlying misinformation spread, and also recognise where these causal claims fit within the broader system, including drawing on findings from more 'open' disciplines, which are less able to make causal inferences, but can provide useful insight into the operating of the system.

Another implication of a systems thinking and critical realist approach is that our understandings of misinformation must adapt as the system itself adapts. In other words, misinformation is a *dynamic* and not a static problem. Successfully researching and combatting misinformation will involve an awareness not only of the limits of different methodologies and disciplines, but also of the phenomenon's tendency toward change. Again, researchers should be

aware of the strengths and limitations of their disciplines findings and claims, and how likely these are to be influenced by changes to societal structures or online information platforms. This awareness should then be reflected in an ongoing updating of knowledge and perspectives, to work with an accurate depiction of the problem and factors contributing to it as changes take place.

A final implication of the analytical approach in this thesis, which combines mixed-methods, critical realism, and systems thinking, is that the findings and actions of researchers in misinformation are not divorced from the context in which misinformation belief and spread occurs. Research on misinformation also impacts how people in the broader public view the problem, and thus how they interact with misinformation. Researchers are thus tasked with the additional responsibility of considering how their work influences perceptions of and responses to misinformation. Such considerations may be particularly salient where research holds the potential to exacerbate existing concerns, such as polarisation, that contribute to misinformation belief and sharing.

2.6 Conclusion

In this chapter I provided an overview of the methodological framework, including the adopted epistemological position of critical realism, and its ramifications for the study of misinformation in psychology. I discussed the use of systems thinking to conceptualise the misinformation problem, its relevance to the study of misinformation generally, and over-viewed its relation to critical realism. I also outlined the definition of misinformation used in the thesis, the development of the line of thinking, and a note on the methods and research designs employed, including a discussion on why I have chosen to use a combination of Frequentist and Bayesian statistical methodologies.

Overall, I employed a broad range of methods, consistent with the grounding of the approach in both systems thinking and critical realism, both of which advocate the use of a broad range of methodologies chosen in accordance with the phenomena in question. These methods included both quantitative and qualitative approaches, and within quantitative approaches, included both Bayesian and Frequentist analyses. While this combination of methods may appear deeply divided in their philosophical underpinnings, the choice to use such methods was based on theoretical as well as pragmatic grounds. In employing a broader range of methodologies and paradigms, with a central theoretical standing in critical realism and systems thinking, it is possible to examine a phenomenon at multiple levels, and in a multi-faceted fashion, without compromising on the underlying views of the ontology in question. The choice and detail of study-specific methods is covered in greater detail in the following chapters.

Chapter Three: The role of anxiety in mediating the relationship between information consumption and COVID-19 protective behaviours

The first study was conducted as a response to the circumstances surrounding the onset of the COVID-19 pandemic in March 2020, including concerns of the 'infodemic' and an overload of (mis)information. Earlier that year I had begun interviewing journalism professionals on constructive journalism as a potential intervention to reduce misinformation and was therefore familiar with literature concerning news use and avoidance, and its potential impacts on mental health and misperceptions. As COVID-19 also sparked many concerns about mental health and the contribution of news media, I looked to investigate the role of information consumption on anxiety and its impact on protective behaviours and belief in COVID-19 misinformation. At the time, there was a strong focus on the idea of an "infodemic"; the consumption of a high volume of information from a wide range of sources and of varying degrees of veracity. In this study, I therefore operationalised information consumption to reflect the concept of an infodemic, reflecting the use of a range of sources across different mediums, rather than focusing on individual news sources. This approach was also more appropriate given the sample size of the study, which was too small to justify a granular analysis of media sources. The results of the study suggested information consumption to have a positive relationship with the uptake of COVID-19 protective behaviours as well as anxiety, leading to questions of the optimisation of news media throughout the pandemic, and more broadly. As part of this optimisation, I recommended finding alternative ways to report on COVID-19, which strengthened the relationship between information consumption and protective behaviours, without causing undue anxiety. Constructive journalism was recommended as a potential approach which looked to balance the need for information on

the pandemic, and encouragement of appropriate protective behaviours, with the impact of news reporting on mental health and anxiety. A summary of the question, methods, results, and implications discussed in this chapter is depicted in Figure 10 below.
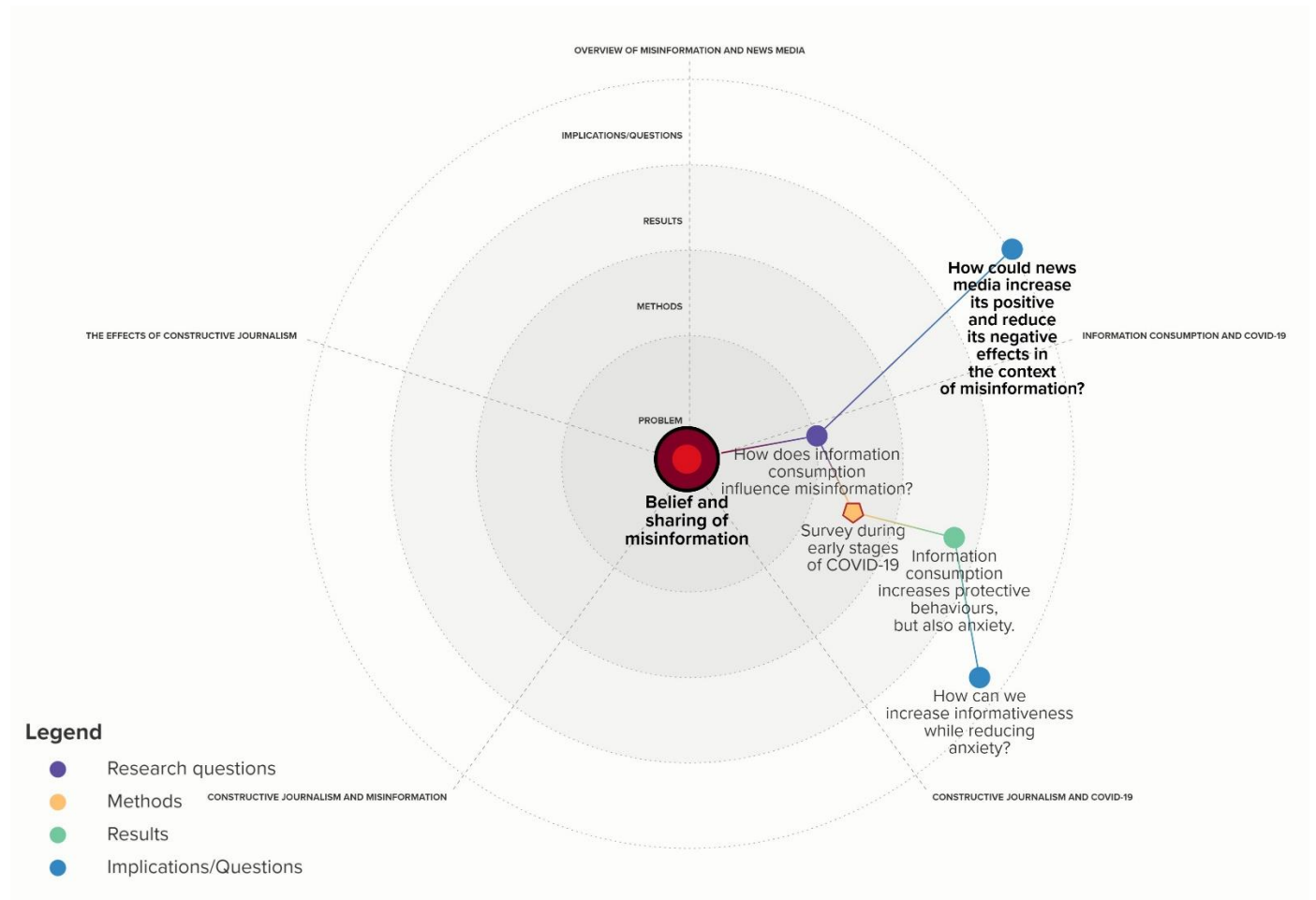
Figure 10. Visual table of contents for the thesis, highlighting the question, methods, results, and implications of the study.

Statement of Authorship

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Principal Author

Name of Principal Author (Candidate)	Natasha van Antwerpen		
Contribution to the Paper	Contributed to all aspects of the project: conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, supervision, operationalization, validation, visualization, writing, and editing.		
Overall percentage (%)	85%		
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
Signature		Date	10.02.2022

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

    i.   the candidate's stated contribution to the publication is accurate (as detailed above);

    ii.   permission is granted for the candidate in include the publication in the thesis; and

    iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Deborah Turnbull		
Contribution to the Paper	Contributed to the conceptualization, investigation, methodology, project administration, resources, supervision, validation, writing, and editing.		
Signature		Date	10.02.2022

Name of Co-Author	Rachel A. Searston

Contribution to the Paper	Contributed to the conceptualization, formal analysis, investigation, methodology, project administration, supervision, validation, visualization, writing, and editing.		
Signature		Date	10.02.2022

The role of anxiety in mediating the relationship between information consumption and COVID-19 protective behaviours

Psychology, Health & Medicine

Natasha van Antwerpen[a]*, Deborah Turnbull[a], and Rachel A. Searston[a]

[a]*School of Psychology, University of Adelaide, Adelaide, Australia*

*natasha.vanantwerpen@adelaide.edu.au

The University of Adelaide, Hughes North Terrace,

Adelaide SA 5005 Australia

The role of anxiety in mediating the relationship between information consumption and COVID-19 protective behaviours

Throughout the COVID-19 pandemic, concerns have been raised about an 'infodemic', with information and misinformation being spread across multiple channels and mediums. Information consumption has also been associated with increased anxiety throughout the pandemic. Thus, the present study investigates the mediating role of state anxiety on the relationship between information consumption (defined as mean frequency of information consumption multiplied by number of information sources) and COVID-19 protective behaviours. We compare results across Australian and United States samples and account for personal risk perception and belief in misinformation about COVID-19. Cross-sectional data collected between 28 and 30 April 2020 were analysed using Bayesian structural equation modelling among participants from Australia ($N = 201$), and the United States ($N = 306$). State anxiety scores were above the conventional clinical cut-off. Information consumption was positively associated with state anxiety, personal risk perception, and COVID-19 protective behaviours in the Australian and the United States samples. Additionally, the relationship between information consumption and COVID-19 protective behaviours was positively mediated by state anxiety in both nations, suggesting some functional benefits of anxiety. Differences in risk perception and belief in misinformation existed between the Australian and United States sample. Findings provide support for current guidance from organisations such as the WHO, APA, and APS on limiting information consumption to reduce anxiety. To effectively communicate critical public health messaging while minimising potential burdens on mental health, there is a need to develop and test interventions that assist people in calibrating the extent and nature of their information consumption.

Keywords: COVID-19; infodemic; anxiety; misinformation; protective behaviours

Literature has established relationships between COVID-19 information consumption and mental health, particularly anxiety (Gao et al., 2020; Ko et al., 2020; Yao, 2020). Given findings on disaster-related media and mental health, including anxiety and post-traumatic stress

(Pfefferbaum et al., 2014), and relationships between information consumption, fear, and anxiety in past disease outbreaks (Jones & Salathé, 2009; Oh et al., 2020), institutions including the Australian Psychological Society (APS) and American Psychological Association (APA) have recommended reducing news consumption—in frequency and numerosity of sources—to alleviate mental health concerns (APS, 2020; Garfin et al., 2020). However, during crises people become more dependent upon media (Ball-Rokeach & DeFleur, 1976), which can communicate health information and appropriate behaviour (Wakefield et al., 2010). Accordingly, we investigated the mediating role of state anxiety on the relationship between information consumption and COVID-19 protective behaviours in Australia and the United States.

Anxiety is associated with a pessimistic appraisal tendency and has been positively associated with risk perceptions (Lerner & Keltner, 2001; Yang & Chu, 2018), and COVID-19 protective behaviours (Riad et al., 2020). However, the inverted-U hypothesis suggests anxiety increases protective behaviour to a point, beyond which it becomes immobilizing (Janis, 1967). Anxiety can also increase willingness to accept and seek out information that contradicts one's views, including in the context of misinformation (Weeks, 2015). However, anxiety can increase belief in misinformation and conspiracy theories – commonly proliferated during disasters, providing an explanation equal to the event (van Prooijen & Douglas, 2017). Šrol et al. (2020) demonstrated a relationship between COVID-19 related anxiety and belief in COVID-19 conspiracy theories, which have been associated with reduced protective behaviours (Allington et al., 2020). The nature and consequences of the relationship between information consumption, anxiety, and protective behaviours during pandemics are, therefore, not well understood.

Media coverage of COVID-19 is complicated by the contemporary media landscape, with a range of mediums and channels, whose nature may influence anxiety and behaviour. During

COVID-19, social media consumption has positively predicted markers of anxiety and depression (Gao et al., 2020), and other online sources have predicted reduced well-being (Ko et al., 2020), while traditional media sources (e.g., newspapers and television news) have less consistently predicted outcomes measuring anxiety and well-being (Ko et al., 2020). The proliferation of information through various mediums has raised concerns about an 'infodemic'; an overload of information and prevalence of misinformation (WHO, 2020b).

The potential negative influence of information consumption on mental health and positive influence on adoption of protective behaviours during a pandemic (e.g., social distancing) presents a trade-off. Thus, there is a need to better understand the potential benefits *and* costs of media communications to public health throughout COVID-19. Accordingly, the present study investigated the role of anxiety as a mediator between information consumption and protective behaviours in the context of COVID-19 while considering belief in misinformation and personal risk perception.

While the contemporary media landscape enables information to be accessed globally, cross-national differences in pandemic responses could influence associations between information consumption and public health outcomes. We examine responses in samples from Australia and the United States, as two nations with differing responses to the pandemic at the population and leadership level, and different media landscapes (Tabari et al., 2020). As the impact of COVID-19 encompassed health, social, and economic concerns, not solely related to the virus, we investigated state anxiety, rather than fear of COVID-19, as a measure of anxiety during COVID-19.

Drawing on the appraisal tendency framework (ATF), which describes anxiety as a high uncertainty emotion with high situational control and a pessimistic appraisal tendency (Lerner &

Keltner, 2001), and previous findings, we hypothesised positive relationships between anxiety, risk perception, and protective behaviours, as in Figure 1. While cross-sectional data precludes the possibility of causational inference, prior research and theory provided grounds to conduct mediation analysis. Accordingly, we examined information consumption across a wide range and frequency of sources, state anxiety, and protective behaviours, while considering personal risk perception and belief in misinformation, within an Australian and a United States sample, providing a comparison between two nations with different responses to the pandemic.
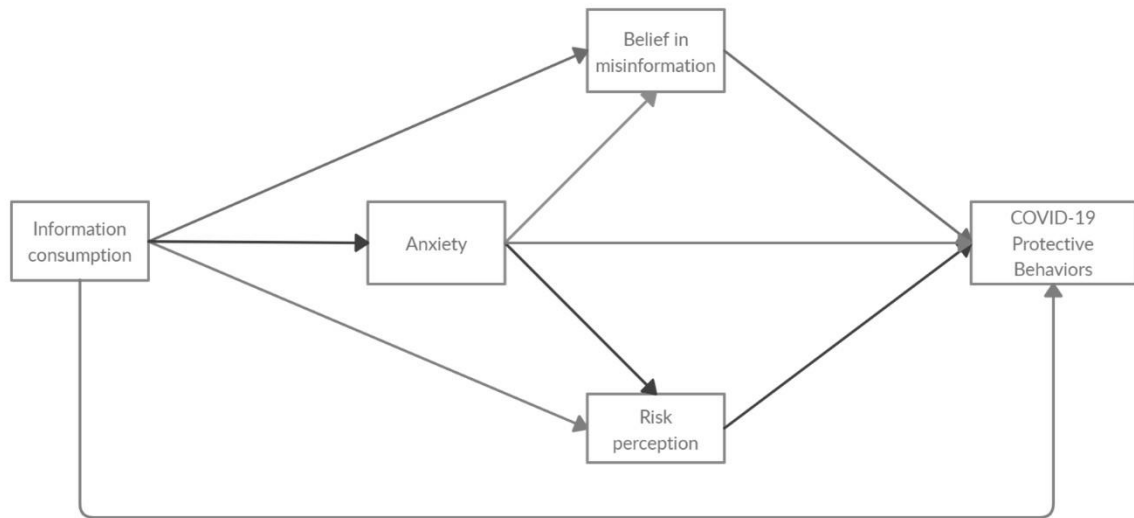
Figure 1. Hypothesized model. Mediation analyses are shown through darker arrows, while other arrows demonstrate expected associations.

Method

Sample

Participants were recruited using Prolific, an online crowdsourcing platform (Prolific, 2019), between 28 and 30 April 2020, seven weeks after COVID-19 was declared a pandemic (WHO, 2020b). A nationally representative United States sample ($N = 306$) was recruited using quota sampling stratified by age ($M = 44.78$, $SD = 15.91$), gender, and ethnicity. Quota sampling

was not available for the Australian sample ($N = 201$), which was approximately gender-balanced, though younger ($M = 31.28$, $SD = 10.23$) and more educated than the general population (Australian Bureau of Statistics, 2016). Demographic details are presented in Figures 2 and 3, and at https://osf.io/n3yqd/. The study was approved by the University of Adelaide Human Research Ethics Committee (approval 20/17).

Over the survey period Australia was in nationwide lockdown, with a daily increase between seven and 15 cases, approximately 6, 700 cumulative cases, and 90 fatalities. The United States had approximately 1.04 million cumulative cases, over 57, 000 fatalities, and a daily increase between 22, 541 and 27, 326 cases (WHO, 2020c).
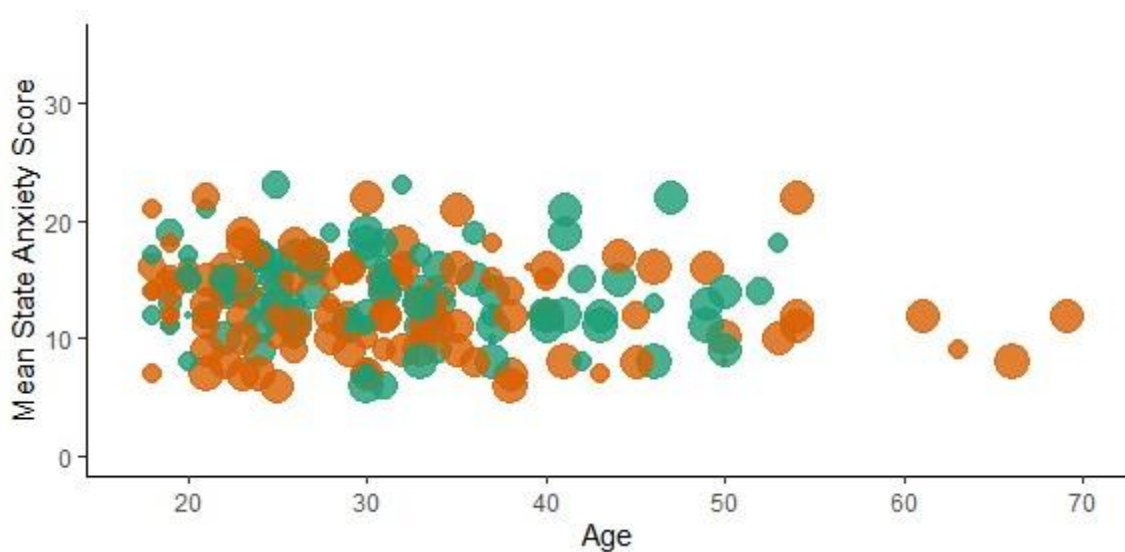
Figure 2. Demographics of the Australian sample plotted against state anxiety scores, females being green and males orange, with the size of each point reflecting education scores.
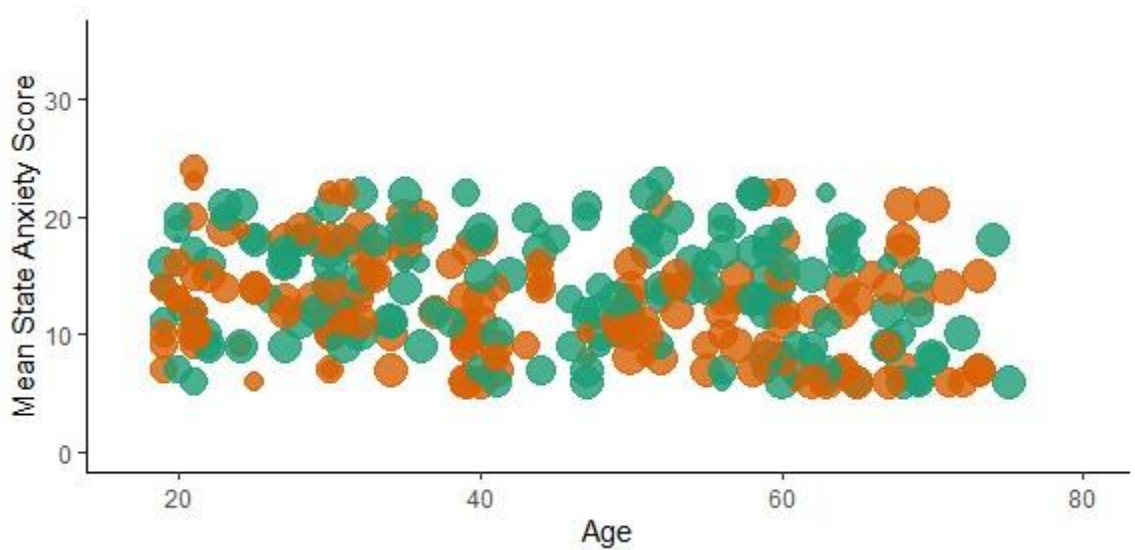
Figure 3. Demographics of the United States sample plotted against state anxiety scores, females being green and males orange, with the size of each point reflecting education scores.

Measures

State anxiety

Participants responded to a six-item short form of the State-Trait Anxiety Index state subscale (STAI-S) (Marteau & Bekker, 1992; Spielberger, 1989), rating statements such as 'I am tense' on a four-point scale from *not at all* (1) to *very much* (4). Within both samples, mean scores were above the conventional cut-off; equivalent to a score of 12 on the short-form (Emons et al., 2019; see Table 1).

Belief in misinformation about COVID-19

Misinformation items were adapted from WHO (2020a), and fact-checking sites NewsGuard (2020) and FactCheck.org (2020). Participants rated their agreement with ten statements such as 'The coronavirus was purposefully engineered' from *completely disagree* (1) to *completely agree* (5). All items are at https://osf.io/n3yqd/.

Personal risk perceptions

Participants rated their perceived likelihood of contracting COVID-19 between now and the end of the year on a sliding scale from *very unlikely* (1) to *very likely* (100), and the perceived severity of a COVID-19 infection for their health from *not at all serious* (1) to *extremely serious* (100). The risk items were combined, but given low correlations (Table 1), results for models separating risk items are at https://osf.io/n3yqd/.

Information consumption

Participants reported usage across 39 sources in the past week, including mass media, social media, interpersonal, institutional, and government sources, for COVID-19 updates from *never* (0) to *every day* (7). Information consumption was operationalized by multiplying participants' mean frequency across reported sources by the number of sources reported to provide an overall snapshot of individual self-reported media consumption habits considering variability and frequency. The full list of sources with means and standard deviations is at https://osf.io/n3yqd/, as are models using a mean index, which produced qualitatively similar results.

COVID-19 protective behaviours

Behaviours were measured using the YouGov Blue (2020) behaviour change scale. Participants responded to seven items about their behaviour change due to COVID-19 over the last week, including: hand washing, changed travel, working from home, stockpiling food, stockpiling medicine, child and elder care, and social distancing on a four-point scale from *has not changed at all* (1) to *has changed completely* (4).

Table 1

Means and Standard Deviations of Key Measures for the United States (N = 306) and Australian (N=201) sample.

Measure	United States			Australia			Range	
	M	*SD*	α	*M*	*SD*	α	*Possible*	*Actual*
Information consumption score	19.18	21.50	.84	15.52	21.96	.88	0-273	0-194
State Anxiety	13.53	4.55	.91	13.25	3.78	.88	6-24	6-24
Personal risk perception	10.09	4.70	r_{xy} = .55	7.98	3.95	r_{xy} = .29	0-20	0.20-18.7
Belief in misinformation about COVID-19	15.28	6.11	.89	14.70	5.30	.85	10-50	10-38
COVID-19 protective behaviour	16.24	4.23	.70	14.63	4.03	.70	6-24	6-24
CRT scores	1.42	1.20	.75	1.55	1.21	.75	0-3	0-3

Note: Variables were scaled using the scale function in base R (R Core Team, 2019) prior to analysis, means and standard deviation show the unscaled variables.

Data Analysis

All analyses were conducted using R 3.6.2 (R Core Team, 2019). Table 1 shows descriptive analyses of the sample and key variables, which were aggregated using scale items. Hypothesized relationships were tested using blavaan (Merkle & Rossell, 2018), and rjags (Lunn et al., 2009), to conduct Bayesian structural equation modelling. Bayesian methods were used as they are better suited to complex models, particularly in small samples (Depaoli & van de Schoot, 2017). Bayesian methods enable the inclusion of prior information about variables and

relationships, as noninformative, weakly informative, or informative priors, which are updated by the data.

Models were run with information consumption as a predictor of COVID-19 protective behaviours, mediated by belief in misinformation about COVID-19 and anxiety, with personal risk perception serially mediated through anxiety. Age, ethnicity, gender, religion, and education were controlled at each step; as was preference for analytical thinking (measured using the CRT; Frederick, 2005), which has been associated with discernment of misinformation and protective behaviours during COVID-19 (Swami & Barron, 2020). All variables were scaled before analysis.

The larger United States sample was analysed first using weakly informative priors based on previous data on COVID-19 and disease outbreaks where available (see https://osf.io/n3yqd/ for priors and references). Non-informative priors used a beta coefficient estimate of 0, and deviation of 8e-2 to account for more variation than rjags default 1e-2 (Lunn et al., 2009). The Australian model was run using posterior distributions from the United States model as weakly informative priors with deviations of 5e-2.

Models were checked and reported using the WAMBS (When to worry and how to Avoid the Misuse of Bayesian Statistics) checklist; including assessments of convergence using trace plots and Gelman diagnostics (Depaoli & van de Schoot, 2017). Both models were run for 25,000 burn-ins and 50,000 samples. The PPP value was used as a measure of model fit; consistent with Cain and Zhang (2019) we used a cut-off of PPP < .10 as indicating poor fit, and .50 indicating excellent fit. As Oh et al. (2020) suggested investigating fear as distinct from anxiety in disease outbreaks and information consumption, exploratory analysis included fear of

COVID-19. As models demonstrated better fit for anxiety only, exploratory models are not reported, but are available at https://osf.io/n3yqd/ along with all models, scripts, plots, and data.

Results

United States

The United States model was an acceptable fit for the data (PPP = .500). Table 2 shows the posterior estimates, standard deviations, and 95% credible intervals for the predictors of each pathway in the model, and total variance explained by each outcome variable.

Information consumption was positively associated with state anxiety and personal risk perception (see Figure 4). Personal risk perception, state anxiety, and information consumption were positively associated with COVID-19 protective behaviours, with credible intervals above zero. Belief in misinformation about COVID-19 was negatively associated with COVID-19 protective behaviours, with the credible interval below zero. State anxiety was associated negatively with belief in misinformation about COVID-19, and positively with personal risk perception.

As hypothesized, state anxiety mediated the relationship between information consumption and COVID-19 protective behaviours, and the relationship was serially mediated by personal risk perception through anxiety (see Table 3). The relationship between information consumption and COVID-19 protective behaviours was not mediated by belief in misinformation about COVID-19.
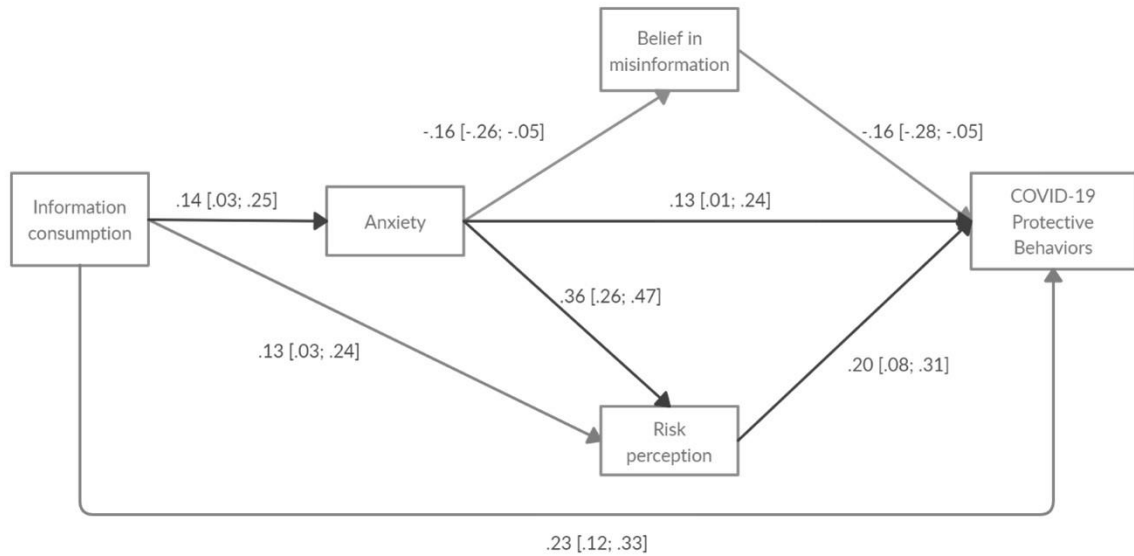
Figure 4. Results of the hypothesized model for the United States sample (*N* = 306) with posterior estimates and upper and lower credibility intervals. Darker arrows indicate mediation analyses.

Australia

The Australian model was an acceptable fit for the data (PPP=.498). Table 2 shows posterior estimates, standard deviations, and 95% credible intervals for the predictors of each pathway in the model, and total variance explained by each outcome variable.

Information consumption was positively associated with state anxiety, and state anxiety and information consumption were positively associated with COVID-19 protective behaviours (see Figure 5). State anxiety mediated the relationship between information consumption and COVID-19 protective behaviours (see Table 3). Unlike the United States model, personal risk perception did not serially mediate the relationship, and was not associated with COVID-19 protective behaviours. Belief in misinformation about COVID-19 did not mediate the relationship between information consumption and COVID-19 protective behaviours and was not associated with COVID-19 protective behaviours.
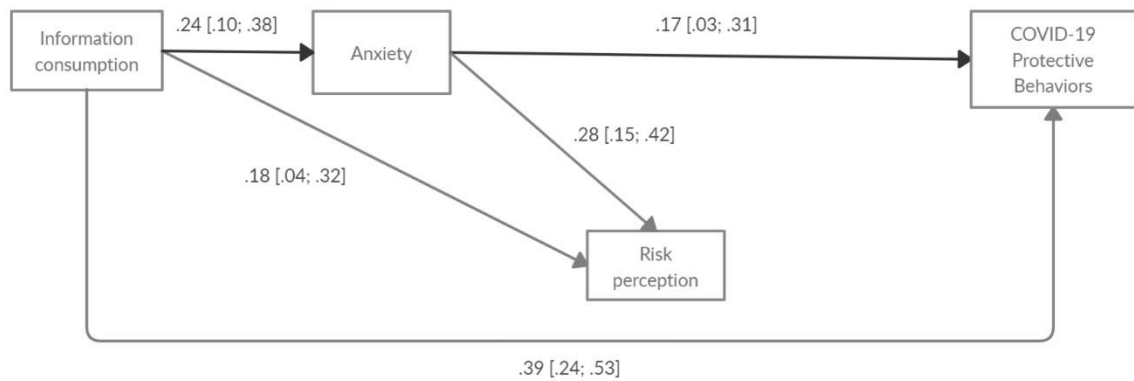
Figure 5. Results of the hypothesized model for the Australian sample (*N* = 201) with posterior estimates and upper and lower credibility intervals. Darker arrows indicate mediation analyses.

Table 2

Posterior estimates, standard deviations, and 95% credibility (confidence) intervals for hypothesized predictors in the United States (*N* = 306) and Australian (*N*=201) sample.

Predictor	United States			Australia		
		95% CI			95% CI	
	estimate (SD)	Lower	Upper	estimate (SD)	Lower	Upper
Belief in Misinformation about COVID-19						
Anxiety	**-.16 (.05)**	**-.26**	**-.05**	.03 (.07)	-.11	.17
Information consumption	.06 (.05)	-.04	.17	.08 (.08)	-.07	.23
R^2	.21			.12		

Anxiety						
Information consumption	**.14 (.06)**	**.03**	**.25**	**.24 (.07)**	**.10**	**.38**
R^2	.09			.09		
Personal Risk Perception						
Anxiety	**.36 (.05)**	**.26**	**.47**	**.28 (.07)**	**.15**	**.42**
Information consumption	**.13 (.05)**	**.03**	**.24**	**.18 (.07)**	**.04**	**.32**
R^2	.20			.20		
COVID-19 Protective Behaviours						
State anxiety	**.13 (.06)**	**.01**	**.24**	**.17 (.07)**	**.03**	**.31**
Belief in COVID-19 Misinformation	**-.16 (.06)**	**-.28**	**-.05**	-.06 (.07)	-.19	.08
Risk perception	**.20 (.06)**	**.08**	**.31**	-.03 (.07)	-.18	.11
Information consumption	**.23 (.05)**	**.12**	**.33**	**.39 (.07)**	**.24**	**.53**
R^2	.25			.22		

Note: R-square includes demographic variables and CRT scores. A table with all covariates is included in the supplementary material. Effects with non-zero credibility intervals are indicated in bold.

Table 3

Mediation Effects of State Anxiety, Personal Risk Perception, and Belief in Misinformation about COVID-19 on COVID-19 Preventative Behaviours for the United States (N=306) and Australia (N=201).

	United States			Australia		
		95% CI			95% CI	
Indirect effects	estimate (SD)	Lower	Upper	estimate (SD)	Lower	Upper
Via belief in misinformation about COVID-19	-.010 (.010)	-.032	.008	-.004 (.009)	-.024	.011
Via state anxiety	**.031 (.015)**	**.004**	**.063**	**.093 (.034)**	**.029**	**.160**
Via state anxiety and personal risk perception	**.010 (.005)**	**.001**	**.021**	-.002 (.005)	-.014	.008

Discussion

Given concerns around information consumption and mental health throughout COVID-19 we investigated state anxiety as a mediator of information consumption and COVID-19 protective behaviours within an Australian and United States sample. We further explored associations with belief in misinformation about COVID-19 and personal risk perception.

Within both samples, state anxiety was above the conventional clinical cut-off, suggesting anxiety was high in the general population. Accordingly, mental health advice around COVID-19 should consider both general and clinical populations and reinforce messages which de-stigmatise anxiety and mental health, and encourage mental health literacy; particularly as references to COVID-19 as the 'new normal' may stigmatise discussion of anxiety and distress.

104

Consistent with previous studies, greater information consumption was positively associated with anxiety in both samples (Ko et al., 2020; Yao, 2020). As predicted, state anxiety mediated the relationship between information consumption and COVID-19 protective behaviours in both samples.

Across all mediations, information consumption had a direct relationship with COVID-19 protective behaviours, indicating it shared a relationship with protective behaviours beyond that accounted for by anxiety and personal risk perception. Further consideration of messaging strategies promoting the relationship between information consumption and protective behaviours without also increasing anxiety may be beneficial. Such an approach might leverage self-efficacy or perceived control to promote protective behaviours (see for example Chong et al., 2020). Given national differences, tailored communication strategies, and research specific to national contexts would be beneficial to provide evidence-based recommendations of information consumption.

While the results provide support for guidelines from public bodies including the WHO (2020a), APA (Garfin et al., 2020), and APS (2020), recommending limiting information consumption to reduce anxiety, they also demonstrate a positive relationship between information consumption and state anxiety and protective behaviours; suggesting a need to balance communications which increase protective behaviours and those which increase anxiety. While broad recommendations to limit information consumption may be beneficial for reducing anxiety, such messaging should be tempered with the need for clear guidance and social connection. Further research into optimal use of information sources during COVID-19 would be beneficial in providing more calibrated guidance.

Greater attention to anxiety and its relationship with information consumption may also improve public informativeness about important events and protective behaviour, as negative emotion is a common reason for news avoidance (Newman et al., 2019). Given high proportions of participants across various studies report using mass media for COVID-19 updates, and concerns of mass media coverage contributing to anxiety, particularly during crises, investigation of alternative methods of reporting, such as 'constructive' journalism approaches (Hermans & Gyldensted, 2019), may be beneficial in addressing the relationship between news media and anxiety; particularly among those less likely to engage with organisations outside of mass and social media.

In both samples, information consumption did not demonstrate a relationship with belief in misinformation about COVID-19. As previous studies have found differing relationships between information sources, particularly social media and online sources, and belief in misinformation about COVID-19 (e.g., Bridgman et al., 2020), this may indicate a need for more fine-grained measurement of media sources in the context of COVID-19 misinformation.

The lack of association between belief in misinformation about COVID-19 and anxiety or COVID-19 protective behaviours in the Australian sample may be due to lower belief in and exposure to misinformation throughout the pandemic (Park et al., 2020; YouGov Cambridge Globalism, 2020). Consistent with past literature, belief in misinformation about COVID-19 demonstrated a negative association with COVID-19 protective behaviours in the United States (Allington et al., 2020). However, contrary to predictions, a negative association was observed between state anxiety and belief in misinformation about COVID-19 in the United States sample. While anxiety has been related to belief in conspiracy theories during COVID-19 (Šrol et al., 2020), anxiety can also increase deliberative processing of and prompt searching for information,

which may decrease the belief in misinformation where accurate facts are available (Weeks, 2015). Additionally, as a large body of COVID-19 misinformation has downplayed the disease, those with greater belief in misinformation may exhibit less anxiety (Nielsen et al., 2020). Further research could aim to elucidate the role of anxiety in COVID-19 misinformation belief.

Information consumption and anxiety were positively associated with personal risk perception in both samples. However, personal risk perception was positively associated with COVID-19 protective behaviours, and serially mediated the relationship between information consumption, state anxiety, and COVID-19 protective behaviours in the United States sample only. As United States participants reported higher risk perception, differences may be due to national contexts at the time. Given Australian and United States participants reported similar levels of concern in the YouGov (2020) assessment of COVID-19 fears, which included social, economic, and health fears, similar levels of anxiety may have been driven by concerns other than infection.

Consistent with the ATF (Lerner, 2001), our results suggest anxiety is to some extent functional within the pandemic context – being positively related to protective behaviours in both samples, and to reduced belief in misinformation in the United States sample. However, these benefits should be considered in conjunction with the negative consequences of anxiety (e.g., debilitating thoughts). Considering the inverted-U hypothesis, that anxiety will be functional to a point after which it becomes debilitating (Janis, 1967), communication strategies could be calibrated to the level of anxiety, to ethically balance its benefits with its negative consequences. Such strategies should consider the burden of anxiety on individual mental health, particularly given the duration of the pandemic, and the possibility anxiety may encourage avoidance rather than constructive protective behaviours (Chong et al., 2020; Garfin et al., 2020).

While existing theory and findings provide grounds for mediation analysis, our study employs observational data, and does not provide evidence of causation. The investigated relationships, particularly between information consumption and anxiety, are likely to be self-reinforcing – some evidence being the approximately equal fit considering a model with anxiety and information consumption interchanged (see https://osf.io/n3yqd/).

Our information consumption variable was created in the absence of an existing measure combining frequency and diversity of sources, and there may be alternative ways of operationalising information consumption. Additionally, frequency may not account for participants' attentiveness to information sources. Due to survey timing, our protective behaviour scale omitted mask-wearing and other protective devices now in frequent use. Results are also likely influenced by situational factors at the time of the survey. Longitudinal research on information consumption, mental health, and protective behaviours would provide beneficial insight into causal patterns and fluctuations throughout the progress of the disease. Also beneficial would be studies focused on populations at greater risk of developing anxiety in response to disease outbreak information, such as those with pre-existing mental health conditions and health care workers.

Overall, until a balance between mental health and informativeness in media communications can be met, recommendations to reduce overall news exposure seem an appropriately conservative response to concerns about the negative consequences of COVID-19 coverage on mental health.

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Chapter Four: What's positive in a pandemic? An international investigation of journalism professionals' perspectives on constructive approaches to COVID-19 news reporting

Following the recommendation made in study one, on the need to balance the information provided by reporting with its impact on anxiety, the next paper details the perspective of journalism professionals about the possible applications and benefits of constructive journalism to reporting on COVID-19. This study emerged during the process of an interview study on constructive journalism and misinformation spread (reported in Chapter Five), following the onset of the pandemic. The participants in this study are therefore a subset of those reported in Chapter Five. All COVID-19 questions were added to the end of the interview schedule, such that all participants, irrespective of their participation in one or both studies, answered the questions in the same order. Among the proposed benefits of constructive journalism throughout COVID-19 were increased engagement with information, increased prosocial responses to the pandemic, increased hope and optimism and reduced negative emotion, and better informativeness about the virus, restrictions, and potential solutions to the pandemic. Overall constructive journalism was proposed to improve informativeness, trust, and engagement with information and institutions throughout COVID-19. In the context of the pandemic, constructive journalism was seen as having the potential to optimise the role of the news media, as recommended in the first study, however, the approach was in need of further theoretical clarity and a stronger evidence-base. As previously, a visual summary of the question, methods, results, and implications discussed in this chapter is included in Figure 11 below.
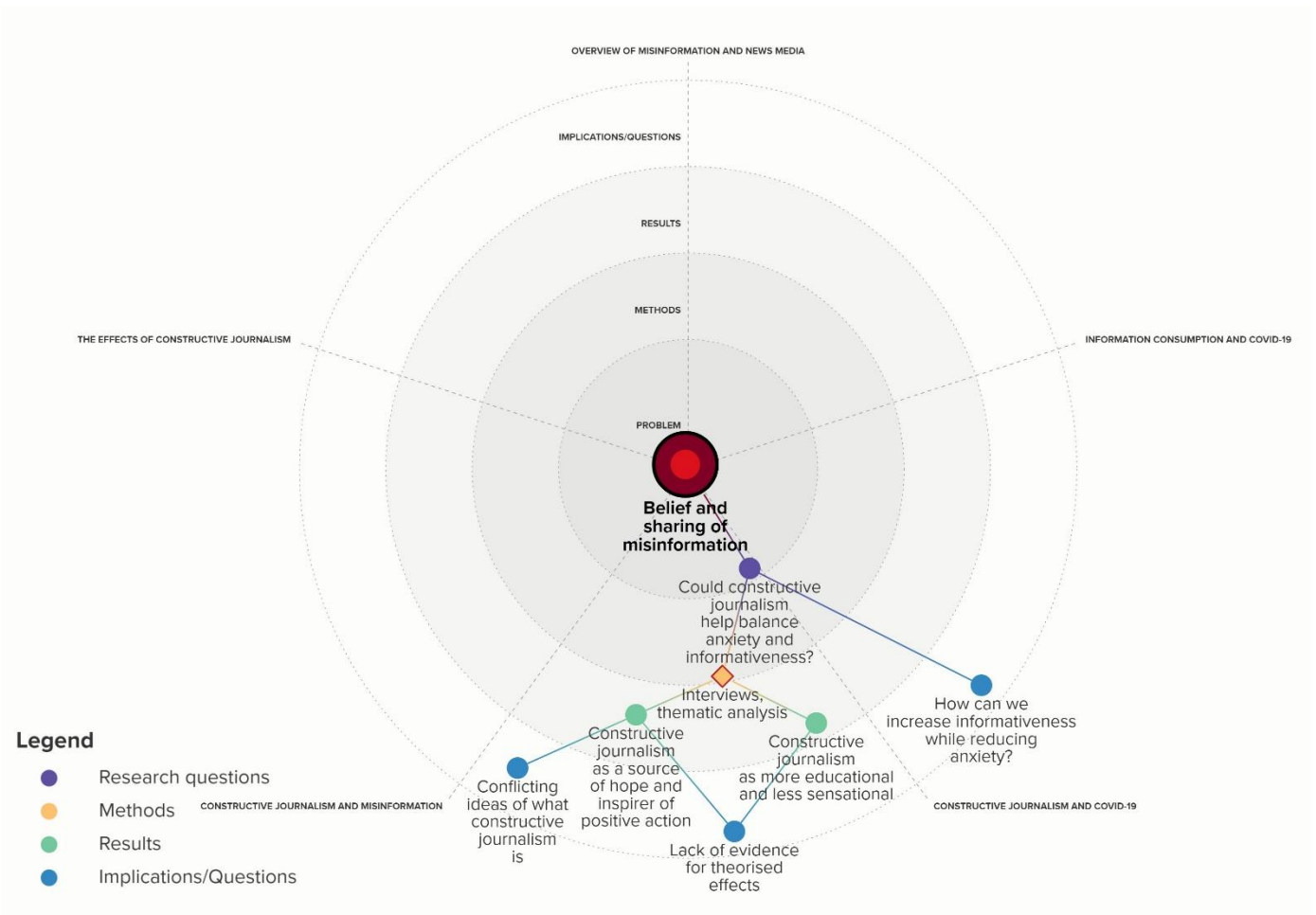
Figure 11. Visual table of contents for the thesis, highlighting the question, methods, results, and implications of the study.

Statement of Authorship

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Principal Author

Name of Principal Author (Candidate)	Natasha van Antwerpen
Contribution to the Paper	Contributed to all aspects of the project: conceptualization, data curation, formal analysis, investigation, methodology, project administration, resources, supervision, visualization, writing, and editing.
Overall percentage (%)	85%
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.
Signature		Date	10.02.2022

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

i.   the candidate's stated contribution to the publication is accurate (as detailed above);
ii. permission is granted for the candidate to include the publication in the thesis; and
iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Deborah Turnbull
Contribution to the Paper	Contributed to the conceptualization, data curation, formal analysis, investigation, methodology, project administration, supervision, writing, and editing.
Signature		Date	10.02.2022

115

Name of Co-Author	Rachel A. Scarston			
Contribution to the Paper	Contributed to the conceptualization, investigation, project administration, supervision, writing, and editing.			
Signature			Date	10.02.2022

What's positive in a pandemic? An international investigation of journalism professionals' perspectives on constructive approaches to COVID-19 news reporting

Throughout COVID-19 the proliferation of misinformation and the impact of negative news on mental health highlights a tension between news media as a source of essential public health information, and news as a source of distress. A suggested approach to reporting which remains informative while tempering audience distress is constructive journalism. We investigated the benefits and applications of constructive news reporting during COVID-19 from the perspectives of journalism professionals interested in constructive approaches. Eleven participants from four continents were interviewed in the first two months of the pandemic. The data were analysed using thematic analysis, and two themes produced: 'Sober not sensational', and 'What's positive in a pandemic?' Six subthemes were also produced: 'beyond the numbers', 'slower reporting', 'understanding uncertainty', 'solutions', 'we're all in the same boat', and 'awakening'. Constructive approaches were seen to help journalists navigate their roles as educators and to provide hope without inciting undue panic. Our interviews suggest constructive news reporting could assist in balancing informativeness and public mental health throughout the pandemic. More work is needed, however, that incorporates randomised controlled testing to establish whether constructive journalism techniques meaningfully impact audience mental health beyond standard approaches.

Keywords: COVID-19, constructive journalism, COVID-19 news, news anxiety, mental health, solutions journalism

Introduction

During the COVID-19 pandemic, news media serve an important role in providing guidance and information to the public about protective behaviours. However, psychologists have expressed concern about the impact of news media on mental health amid the pandemic, with previous research demonstrating disaster coverage to contribute to poor mental health outcomes (e.g., Pfefferbaum et al., 2014). COVID-19 media consumption has been associated

with negative mental health outcomes, including increased anxiety and depression (Gao et al., 2020; Ko et al., 2020; Riehm et al., 2020; Yao, 2020). These findings have led numerous organisations, including the World Health Organization (WHO) and American Psychological Association (APA), to recommend reducing news consumption throughout the pandemic in the interests of mental health (Garfin, Silver, & Holman, 2020; WHO, 2020a). Given news media's importance for remaining informed, there is a clear need for reporting techniques that balance information with their influence on mental health. One method is constructive journalism, which applies positive psychology techniques to news reporting, and reports developments and solutions in addition to problems and disasters (Haagerup, 2017; McIntyre & Gyldensted, 2018). However, constructive journalism is a relatively new approach, whose theory and practical application is being developed. Accordingly, we interviewed 11 journalism professionals across four continents to investigate their use and perception of constructive journalism during COVID-19. We aimed to provide insight into the use of constructive journalism throughout the pandemic to inform theoretical development and empirical testing of constructive approaches to news reporting.

1. Literature Review

1.1 News media and staying informed on COVID-19

According to media dependency theory, people become more dependent on media in times of crisis, such as large-scale disease outbreaks (Ball-Rokeach & DeFleur, 1976). Journalism has played an important role in guiding rapidly changing information about COVID-19 (e.g., symptoms, testing, and vaccinations, and protective behaviours including social distancing, mask-wearing, and hygiene), and public health responses by governing bodies (e.g., lockdowns and contact tracing efforts; Basch et al., 2020; Perreault & Perreault, 2021). The

pandemic has been accompanied by a proliferation of misinformation and concerns of an "infodemic" –an abundance of information of varying degrees of truthfulness (Brennen, Felix, Howard, & Kleis Nielsen, 2020; WHO, 2020b). Journalism has served an additional function in debunking misinformation about public health issues (Perreault & Perreault, 2021).

Survey research found the pandemic was originally accompanied by increases in news consumption (Newman, Fletcher, Schulz, Andi, & Nielsen, 2020). However, a follow-up survey in the United Kingdom found a subsequent rise in news avoidance, which respondents primarily attributed to negative mood (Kalogeropoulos, Fletcher, & Nielsen, 2020). Similarly, participants in the United States and Australia reported avoiding or taking breaks from the news throughout the pandemic due to its negative effect on mood, and difficulty discerning true from false information (Mitchell, Oliphant, & Shearer, 2020; Park, Fisher, Young Lee, & McGuiness, 2020).

1.2 News media and mental health in COVID-19

The ongoing prominence of the pandemic in news media cycles has sparked interest in the relationship between news media and mental health. Recent studies have found news consumption throughout the pandemic positively correlated with mental distress (Gao et al., 2020; Ko et al., 2020; Riehm et al., 2020; Yao, 2020). Previous work on disaster coverage, including the 9/11 terrorist attacks, and the H1N1 and Ebola outbreaks, has also provided correlational evidence suggesting news coverage of disasters and disease outbreaks can adversely affect mental health (Dillard & Yang, 2019; Jones & Salathé, 2009; Pfefferbaum et al., 2014). Numerous organisations, including the WHO, and psychological societies including the APA, have thus recommended reducing news consumption to improve mental health throughout COVID-19 (Garfin et al., 2020; WHO, 2020a).

Beyond disaster coverage, longitudinal and experimental work has demonstrated an influence of news media on mental health. News consumption has been positively associated with negative mood (de Hoog & Verboon, 2019). Prolonged news exposure has also been related to decreased altruism, and perceiving others as more hostile (Boukes & Vliegenthart, 2017). Pre-pandemic, an APA survey found 56% of United States participants reported following the news as a source of stress (American Psychological Association, 2017).

News media are critical to disseminating sound and current information about COVID-19, and public health messaging on suggested protective behaviours, health guidance, symptom identification, and vaccination recommendations. However, there is a clear need to balance the provision of information with its impact on mental health (Rajkumar, 2020).

1.3 Constructive journalism

While organisations have suggested more mindful news consumption, this strategy overwhelmingly places the burden of change on individual news consumers. Another approach emphasises the role of news media creators in shaping the messaging around COVID-19 as 'constructive' for public health (MacDonald, 2021). Constructive journalism emerged partly in response to the influence of news consumption on mood and mental health, with the aim of empowering consumers (McIntyre & Gyldensted, 2017). Though a relatively new approach, constructive journalism has been related to previous movements, such as civic journalism, which advocate a more public-oriented approach to reporting (Hermans & Drok, 2018).

Constructive journalism has multiple proponents and schools of thought, primarily those of Haagerup (2017) and Gyldensted (2015). Both advocate presenting a more comprehensive view of world events, particularly regarding developments and progress, and constructive

responses to challenges, than typically portrayed in mainstream news. Haagerup (2017) focuses on editorial and selection processes, aiming to report a more realistic balance of developments and problems, akin to more traditionally passive modes of journalism. By contrast, Gyldensted (2015) draws on positive psychology and behavioural science, focusing on journalism's impact on audiences and society, and journalism as instigating positive change (Bro, 2019). Outside of differences in proponents' views, constructive journalism has been criticised for lacking conceptual clarity, though proponents note such difficulties are expected while the approach develops (Bro, 2019). Recent efforts have aimed to provide clearer practical and theoretical guidelines on constructive journalism techniques. Hermans and Gyldensted (2019) identified six constructive journalism techniques, including: solutions, future orientation, inclusiveness and diversity, context/The Rosling, empowerment, and co-creation. In addition to providing more accurate and positive views, such techniques are intended to encourage civic engagement with news media (Hermans & Drok, 2018).

Constructive journalism has also been criticized as blurring the line between journalism and activism, being uncritical, and portraying a falsely cheerful view of the world (Bro, 2019). While responses to the first criticism vary, both Haagerup (2017) and Gyldensted (2015) refute the latter, noting the inclusion of developments and prospective solutions neither negates critical reporting nor necessitates false positivity.

Research on constructive journalism is still emerging, however, studies have explored some benefits of the approach. A two-week longitudinal study found participants reported higher positive emotion when receiving prompts to use constructive news relative to a control group (McIntyre, 2020). Experimental studies on constructive journalism have often investigated the inclusion of positive emotions and solutions-focused messaging in news. Such studies have

found increases in positive emotion among participants in constructive journalism conditions, comparative to more prototypical news reporting conditions (e.g., neutral (no emotional valence or solution), negative (negative emotional valence and problems-oriented framing), or shock news conditions (sensationalised or written to evoke strong negative emotion); Baden, McIntyre, & Homberg, 2019; Hermans & Prins, 2020; McIntyre & Sobel, 2017). Similarly, in experimental and survey studies participants have reported a preference for constructive news stories (Baden et al., 2019). However, less clear is whether such preference extends to intentions to interact with or share constructive stories, or behaviour. Interest and self-efficacy may influence these effects (Baden et al., 2019; Curry et al., 2016; Hermans & Prins, 2020; McIntyre & Sobel, 2017). While the effects of constructive journalism, and the circumstances they are elicited under, are being clarified by ongoing research, the approach shows promise in increasing positive (and reducing negative) emotion following news consumption. Increasing positive emotion would be of clear benefit to consumers of COVID-19 news. Accordingly, in the present work, we explore the perspectives of journalism professionals on the application and benefits of constructive journalism throughout the pandemic, particularly regarding balancing informativeness and mental health. Given the lack of conceptual clarity around constructive journalism, we aim to understand how constructive journalism could be implemented, and identify where further theoretical development may be needed to advance the concept of constructive journalism and more rigorous empirical testing of its impacts.

2. Methods

2.1 Procedure

The present study documents journalism professionals' perspectives on the benefits and applications of constructive news reporting during a pandemic. The constructive journalism

network, an online platform for professionals interested in constructive journalism, was used to recruit participants and information-rich cases across jurisdictions. Professionals whose details were provided on the network were contacted by email with the study's focus and purpose explained. Additional snowball sampling also occurred. Those expressing interest were emailed an information sheet and consent form, and interview times were arranged either in person or via phone or video conference.

The first author conducted 11 one-on-one interviews from late March to late April 2020, approximately two weeks to two months after COVID-19 was declared a pandemic. Following explanation of the study and written or verbal consent, semi-structured interviews were conducted using a schedule with pre-defined guiding questions and prompts. The interviews lasted 29-140 minutes (Mdn = 68 minutes).

Initial questions concerned participants' experiences in journalism to build rapport and provide context to later responses. Questions were formulated to address aspects relevant to constructive journalism and its use throughout COVID-19. Table 1 contains some indicative questions. Follow-up questions were asked after participant responses, allowing flexibility given the diversity of the sample and their contexts.

Table 1. Indicative semi-structured interview questions.

Indicative questions
How do you view the role and response of journalism in relation to the events of COVID-19?
How, if at all, could constructive journalism contribute to the reporting around COVID-19?
How, if at all, could constructive journalism contribute to public understanding and responses to COVID-19?

2.2 Analytic Approach

All interviews were digitally recorded and transcribed verbatim by the first author, using

pseudonyms and replacing identifying details. The audio recording failed for one interview, accordingly, the interviewer wrote notes in collaboration with the participant. Following transcription, the data corpus was analysed using thematic analysis, with a blended inductive and theoretical approach (Braun & Clarke, 2019). A position of critical realism was adopted, taking as its foundation that while there is a knowable world, the ability to accurately understand and comprehend it is limited by the boundaries of human perception.

Transcripts were stored and analysed in Nvivo 12® (QSR International Pty Ltd, 2012). Analysis was undertaken following the six steps described in Braun and Clarke (2019). First was familiarisation with the data, including transcription. Consistent with guidelines for thematic analysis, interviews were transcribed verbatim, including all verbal and nonverbal utterances. At the request of participants, reported quotations have been cleaned of non-semantic sounds and utterances (e.g., "um" or coughing). Familiarisation included repeat readings of the transcripts, noting down initial impressions and patterns.

The second phase involved generating initial codes. Consistent with the blend of theoretical and inductive analysis, coding was centred around specific questions. Coding aimed to produce as many themes and patterns within the data as were possible and relevant to the research question. The third phase involved arranging the codes into themes. Throughout this process, codes were inspected and sorted into themes and subthemes, including through visualisations. The fourth phase involved reviewing the theme content and examining them for internal homogeneity and external heterogeneity. The same process was repeated across the data set to assess whether the thematic map accurately represented the data and to check for additional themes. The fifth phase involved defining and naming the themes according to their content. Throughout this phase a detailed analysis and narrative was written for each theme. The

final phase involved writing up the data and analysis.

2.3 Ethics and quality criteria

The study was approved by the University of Adelaide Human Research Ethics Committee (HREC 01/20). While efforts were made to understand the data on their terms, each researcher approached the research from their positions and biases. All three authors have a background in areas of health and cognitive psychology and are not trained journalists.

Participants were able to review their transcripts to verify accuracy and were sent a summary of the findings with invitation to comment. Throughout the analytic process, the first author discussed codes and themes with the second author, cross-checked extracts from the data against themes and thematic mind-maps, and recorded ongoing thoughts and developments in an audit trail.

3. Results and discussion

3.1 Participants

A total of 11 journalism professionals participated. Participants worked across print and broadcast news as reporters, researchers, and trainers. While all participants expressed interest in constructive journalism, they varied in familiarity from those with an interest but no formal training to having published books on constructive journalism. Seven participants were from European nations (UK-inclusive), one from Africa, one from Australia, and two from Northern America. The heterogeneous sample was fitting to investigate the uses and benefits of constructive journalism during COVID-19 across various jurisdictions and formats. Given constructive journalism's lack of a clear definition , such diversity also assists in identifying commonalities in interpretations of the approach.

3.2 Overview of themes

Two themes, 'sober not sensational' and 'what's positive in a pandemic?' and six subthemes – 'beyond the numbers', 'slower reporting', 'understanding uncertainty', 'solutions', 'we're all in the same boat', and 'awakening' – were generated, as in Figure 1. 'Sober not sensational' was primarily focused on story selection and framing, akin to Haagerup's (2017) approach, and discussed the role of journalists as educators throughout the pandemic. 'What's positive in a pandemic?' instead reflected Gyldensted's (2015) approach; seeing journalists' role as providing hope, and journalists as active and influential in responses to COVID-19. Both themes included emphasis on the responsibility of journalists and newsrooms towards the impact of reporting. Participants discussed constructive approaches as balancing tension between fear and informativeness, including reporting on solutions, slower and more contextual reporting, acknowledging uncertainty, co-creation with consumers, recognition of positive stories and aspects of the pandemic response, and encouraging global solidarity. Constructive journalism approaches were thought to balance informing audiences and instilling necessary levels of caution without inciting panic, and to encourage constructive responses to the pandemic.
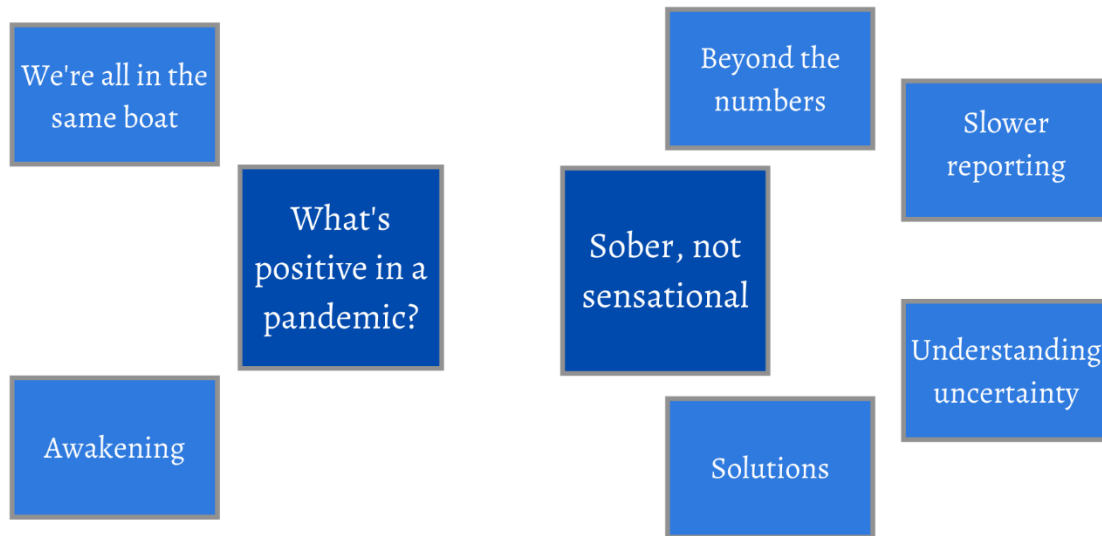
Figure 1. Overview of themes and subthemes.

3.3 Themes

3.3.1 Sober, not sensational

When considering reporting on COVID-19, participants expressed tension between their role to inform the public and avoiding inciting undue panic. They stressed needing balanced and sober approaches, ensuring reports were fact-based and disseminated information understandably and educationally while avoiding sensationalisation. However, such balance was made difficult by the public's variable responses, and reporting's effects on mental health. Participants considered news media to have an important and powerful role as educators throughout the pandemic, with constructive journalism encouraging more responsibility toward this role and reporting's effects.

> I suspect some people in the public are not taking it that seriously, some people are
> doing good things, and then some people are probably really panicked and stressed,
> and probably the news isn't helping, but at the same time, the news is such a
> powerful way of getting society all on board and all the news organizations are

127

working really well together to get that information out there and I think we're well placed to do that. (Reporter, Australia)

Multiple participants recounted tensions between the role of journalism and news to inform, and to avoid inciting panic, noting a need for ongoing discussion and reflection on reporting practices, as much of this balance could only be evaluated in hindsight.

> We discuss every day not to be alarmistic and not to create panic, and at the same time, trying to not hold back, of course, anything that might be essential to report about in this, and it's easy to say afterwards what was right and what was wrong in the reporting and it's always discussed afterwards (Editor, Sweden)

Constructive journalism was also seen as emphasising the pedagogical role of journalism, being more socially conscious when selecting and communicating information.

> I hope that in the future a lot of journalists will think constructive journalism at once, because then you'll add so much more to the public because we have a crucial role to actually give the right information and educate. I think it's important that we educate, not just entertaining and conflicts but, educate people as well. (Editor, Norway)

Most participants perceived news outlets as doing well in covering the pandemic soberly; being thorough, cooperative, and fact-checking, though some disagreed, potentially reflecting international differences in media coverage. The need for sober reporting and techniques for its implementation were further discussed in four subthemes: beyond the numbers; slower reporting; understanding uncertainty; and solutions.

3.3.1.1. Beyond the numbers

Many participants discussed death and infection counts as inciting anxiety and panic, and as less helpful than looking beyond the numbers, to provide context and understanding.

128

Constructive approaches were seen to entail inclusion of background information and feature articles, along with greater emphasis on human interest, reporting the personal effect of COVID-19 on individuals.

> Instead of just, talking about the numbers, going up, the numbers, the numbers, scaring people. You should explain, what is behind the numbers. (Editor, Norway)

While participants discussed moving beyond statistical counts, they differed in how and why. Some focused on encouraging empathy within readers by reporting showing that 'behind every number, it's a person, and that's where the story is" (Editor, Norway). However, consistent with journalists as educators, others placed greater emphasis on reporting the context behind counts in different countries, cities, and regions, so readers would be better informed about how and why the virus spread. A focus on individuals could also be misleading and sensationalising, drawing attention to anomalies in deaths and recoveries; encouraging panic or blasé responses. Reporting beyond the numbers and on individual cases was discussed as needing broader context, helping audiences calibrate their understanding of the virus and its risk.

> You know that kind of emotional tug on these lives that connect them very much to ours, like that could be me, I've just had a child, I'm 29, I'm 30, I'm close to that. They're not. They're the outliers. […] And similarly, it's just as stupid, for news organisations to say, this 102-year-old has just recovered from coronavirus (Research and training, United Kingdom)

Participants also noted tension between their role to engage readers, including emotionally, through portraying stories of individuals, and to provide accurate understandings of events. Constructive journalism was thought to emphasise the need for responsible reporting, with greater focus on context.

While yet to be peer-reviewed, correlational work has found a positive association between frequent tracking of COVID-19 statistics (e.g., infections and death rates) and increased anxiety, risk perception, and hoarding behaviours among United States participants (Peters, 2020). Exploration and evaluation of alternative ways to present statistics (e.g., adopting a slower and more contextual approach to reporting as suggested by participants) may assist in communicating information without overwhelming audiences. While participants discussed feature and in-depth articles, drawing on work by Rosling, Rosling, and Rönnlund (2018), visualisations, such as that used by *The New York Times* to depict the United States COVID-19 death toll (Coleman, 2021), involving international comparisons and information on changes over time could assist in communicating statistics engagingly and comprehensively. As the primary focus of this subtheme was providing context, a technique less studied in work on constructive journalism, further investigation into the effects of including context in COVID-19 reporting, in various formats, is warranted, as participants considered context useful in educating and balancing informativeness with panic but differed in its implementation.

3.3.1.2. Slower reporting

While a separate approach to constructive journalism, slower reporting was discussed as beneficial for constructive approaches, again providing a comprehensive and contextual view of the pandemic, focusing on potential solutions and deeper understanding, rather than immediate events which could incite panic. Slowing down reporting was seen to improve the investigative and educational aspect of reporting, allowing greater context and explanation when conveying information.

When it comes out minute by minute like that, and people are just bombarded, like, here's one thing I have to worry about, and the next minute I have to worry about something else and the next minute I have to worry about something else. It's, your level of stress is huge then. If you can kind of put it in a more concise and informative part but deliver it slowly or less often I think that would help people digest it better and be able to handle those things. (Editor, Canada)

Other participants similarly described approaches such as daily briefings and summaries of current restrictions and cases. Again, these slower approaches were considered part of their role as educators throughout the pandemic, reducing the volume of information and subsequent stress for audiences, and enabling dissemination that promoted deeper understanding, rather than presenting disconnected events. However, tension was noted with the need for timely information, with slower approaches more strongly advocated by those working in local journalism, with less pressing time constraints.

3.3.1.3. Understanding uncertainty

Reporting accurately and truthfully was also difficult in an uncertain time, with conflicting experts, and unclear information, including uncertainty on the best and most balanced way to convey information. Such uncertainty raised tensions concerning journalists' role as educators, and trust, from both the audience and journalists. Participants considered constructive journalism useful in navigating uncertainty, though differing on how. Some discussed being as comprehensive as possible, while acknowledging uncertainty where necessary, viewing this as important to building trust.

It's very important to do the whole work, to find the stories, but also, to tell the truth, as long as you know the truth, but also be very honest, that we don't know everything, I think that will build trust (Editor 2, Norway)

Communicating uncertainty has generally been perceived to cause a decrease in trust, however, recent experimental evidence across numerous scientific contexts suggests this decrease to be minor (van der Bles, van der Linden, Freeman, & Spiegelhalter, 2020). Further research is needed into the effects of communicating uncertainty on trust, particularly in contexts such as COVID-19 where information is changing rapidly.

In addition to being extensive, participants emphasised the need for critical reporting, including follow-up stories evaluating how events transpired compared to earlier predictions and estimates. Ongoing evaluation and discussion were considered important in adjusting reporting throughout the unfolding crisis. However, being critical, while necessary, was "not [a] very exact tool" (Editor, Sweden). Tensions were also noted between the democratic right for everyone to have an opinion and presenting the highest quality of evidence, particularly where experts held opposing views.

There are lots of different views among the experts on this virus. There are so many you can find a new expert every day who has a different view and who is telling the truth? It's impossible to know, so what you can do is try to report extensively, but also try to have a critical approach, and to be as sober as possible. But it is not easy […] that's why it's important to go back afterwards to say okay, when this crisis is over, let's look back, what happened? How, what did people say and how, what turned out to be? So there you can do a lot of good journalism by doing these follow up stories (Editor, Sweden)

Participants also acknowledged the difficulty of presenting all approaches, even critically. Reporting only where there was consensus was seen to reduce uncertainty, but conversely, not

making everything public risked being perceived as lying or censoring information.

> We don't have agreement, common agreement, don't speak about it. Speak about it when you have an agreement and you are okay, and we can go home. But […] when you don't make everything public, they will say oh they lie to you and it's a problem (Coordinator and editor, France)

Uncertainty also encompassed the difficulty of knowing how helpful reporting was, compared to how anxiety-inducing. While participants were conscious of reporting's effect on audiences, and often felt responsible for their impact, knowing this balance between being fear-invoking and raising due awareness was easier in hindsight.

> The story's cutting through, but also, I think it probably triggered panic in people, anxiety in people, how helpful that panic and anxiety is, I don't know, I don't think anyone really knows because we're in the middle of the crisis (Reporter, Australia)

Overall, participants considered it important to acknowledge the pandemic's inherent uncertainty in evaluating the impact of reporting and conveying information to the public. Acknowledging and demarcating certain from uncertain claims was thought important to building trust. As noted by Blom, Rønlev, Hansen, and Ljungdalh (2021), in uncertain times, journalists often encourage experts to engage in speculation, which can be misleading. Asking critical questions and addressing evidence and outcomes based on their strength and likelihood, as suggested by participants, are consistent with Blom et al.'s (2021) suggestions for fostering engagement and education while moderating potential misinformation when engaging with uncertainty and speculation during COVID-19. However, further discussion on how journalists balance the future orientation of constructive journalism with due consideration of uncertainty warrants further study.

3.3.1.4. Solutions

Reporting on solutions was the most mentioned technique of constructive journalism relevant to COVID-19, and was considered part of journalism's educating role, providing people with information instilling hope or practical guidance, rather than a sense of increasing death counts without alternatives. While many solutions mentioned by participants concerned COVID-19 directly, some discussed actionable information for tangential difficulties, such as adjusting to working from home or avoiding increased cyber-security risks. Such solutions were seen as empowering audiences.

> Constructive journalism could also [be] anything that's empowering the reader I think is a good thing. An article I did the other day was about COVID 19 email scams. So I spoke to different cyber security experts, being like, 'hey, by the by, you're probably going to get this, what are the scams that they were seeing, so the point of the article was to give people knowledge that hopefully they could avoid some of these scams. (Reporter, Australia)

Reporting solutions also included comprehensively addressing various approaches to the pandemic across countries with follow-ups, enabling evaluation. Participants described a range of solutions that could be reported, including successful approaches in the current pandemic and evaluations of past epidemic strategies, including those employed throughout SARS, Ebola, or AIDS epidemics. Reporting on solutions and attempts to combat the pandemic were considered an important aspect of balancing panic with hope among audiences.

> The amount of stories now being made about the corona crisis is itself creating panic and alarm, so that's why it's so important to have these constructive stories, to show what is being done, what kind of research, how is the vaccine research going, things like that to also create this hope of humanity is trying to solve the problem and it can be solved (Editor, Sweden)

Such reporting was considered beneficial in providing hope, context, and perspective, and increasing awareness of alternative approaches. While participants expressed solutions reporting

134

as a source of hope and education throughout the pandemic, providing a more complete picture, they differed when considering its role in social change. Some participants perceived solutions as a form of empowerment enabling citizens to pressure for government implementation where lacking.

> When we look at what is working well then we can put pressure on our government to say we should be testing. It's working. We can see it's working, there is absolutely no reason for us not to put resources there because we know, it's effective. And so it's a really, powerful tool in holding power to account when you're able to see progress taking place. (Research and training, United Kingdom)

However, it was considered important to be critical and recognise the limitations of knowledge in solutions, including reporting ongoing comparisons and follow-ups. Some participants included future orientation when discussing solutions, considering it important stories focused on how crises could be avoided in future.

> The main thing I think is to, work to get up solutions. What can the world do about it? What will work, how, later, can we avoid it? How can we avoid it? Telling all, coming up with those stories that look to the future and to try to help society, the world, making it better next time (Editor 2, Norway)

Including solutions in reporting has demonstrated efficacy for increasing positive emotions and decreasing negative ones in experimental contexts (Baden et al., 2019; McIntyre, 2015). Such evidence suggests reporting on solutions may be an effective strategy for reducing the mental health burden of news consumption. As participants suggested, reporting on solutions may assist in understanding the context of COVID-19 events and statistics, particularly where they enable cross-national comparison. Experimental work on solutions in reporting has demonstrated some evidence of increasing participants' willingness to respond to issues (e.g.,

135

donating to charity), though this finding has been less replicable than the influence of solutions-reporting on emotions (Baden et al., 2019; McIntyre & Sobel, 2017). Further research should test participants' beliefs that solutions-reporting enables citizens to actively engage with responses to COVID-19 and encourages pursuit of measures successful elsewhere.

Theme summary

'Sober not sensational' reflected the role of journalists as educators throughout COVID-19. Constructive journalism was seen to facilitate this role through four main techniques. First, going 'beyond the numbers' and providing context. Second, slower and more considered reporting rather than focusing on immediate events. Third, recognizing uncertainty, including viewing the information given to journalists critically and clearly demarcating fact from opinion and prediction. Finally, reporting on solutions, comparing responses to COVID-19, and providing an informed view of responses in progress. The theme and its techniques were reflective of Haagerup's (2017) approach to constructive journalism, discussing changes to journalistic and editorial decisions with an aim to convey 'the best obtainable version of the truth' (p. 16). The techniques in this theme aligned with those previously discussed in constructive journalism, including solutions, context, and future orientation (Hermans & Gyldensted, 2019). While such techniques were perceived to contribute to increased informativeness and reduced anxiety among news consumers, their implementation and purpose differed among participants, indicating a need for further development.

3.3.2. What's positive in a pandemic?

The second theme bore greater similarity to Gyldensted's (2015) approach to constructive journalism, focusing on reporting's impact on audience responses. Many participants considered providing hope an important role of journalism throughout the pandemic, particularly as

136

individuals are disconnected from their usual channels of communication and society looks for resolutions to the pandemic. Reporting positive stories was considered central to providing hope. In addition to solutions, examples included questioning whether COVID-19 could be an opportunity for growth and covering areas of improvement. Such reporting included stories on more people exercising, increased time with family, areas where economy or education improved, and people helping each other during COVID-19. Participants also differed in the importance they gave positive reporting. While considering providing hope important, some saw positive stories as a primary role of constructive journalism, encouraging constructive action, while others considered it a supporting role concurrent with reporting on and encouraging solutions and future outcomes.

> The main thing for constructive journalism, that's looking to the future, what can we do better, but also, in the meantime in these days, telling about what's going good. (Editor 2, Norway)

Consistent with criticisms of constructive journalism, participants noted positivity still required journalists to be critical, particularly when reporting on those in positions of power. Journalists were seen as needing to maintain their role as democratic watchdogs while encouraging hope, positivity, and solidarity.

> I thought, what happens now, and they can't forget they must not forget to be critical, they must not go in the other direction. To be too positive, of telling this and this and this and being not critical enough to the Prime Minister also, but they are both (Editor 2, Norway)

While participants considered reporting positive stories during COVID-19 important, they acknowledged it was difficult, and affected by the journalist's context, one participant noting "99.5% of [stories] are negative" (Editor, Norway). While some audience members

137

needed positive stories, the consequences of COVID-19 in other contexts could result in positive stories being considered insensitive.

> In Croatia I know ten thousand people lost their jobs now because of the corona epidemic, because they cannot work in the restaurants, cafes are all closed and if you give them a constructive story about corona, they will be like, you know, please, shut up. So, it's the culture, it's the history, it's the political circumstances, and I think that all matters in the way, we perceive constructive journalism and the way we can or cannot do constructive journalism as professionals. (Broadcast and research, Croatia)

However, the same reporter noted her students "said that they are missing some good store*s*" in the news, suggesting a need to consider varying demands across a range of audience groups, even within specific contexts. Overall, positive stories were considered important in providing hope, and encouraging constructive responses to the virus, as discussed below.

3.3.2.1. We're all in the same boat

Some participants discussed constructive journalism as encouraging solidarity throughout COVID-19. The global nature of the virus was considered to increase cooperation at various levels, including an exchange of ideas and experiences, and increased awareness of our ability to do so. Focusing on solidarity, as a mindset and when reporting, was considered to encourage a universal view, and foster engagement with the opportunities it provided. Such approaches tended toward an active view of the journalist's role, as an agent of social change.

> We have the possibility to understand even better, and exchange ideas and experiences and it's important to be conscious of that, to be aware of that (Coordinator and editor, France)

The above participant ran international online workshops discussing and subsequently

reporting changes people hoped to see from COVID-19; others discussed showing respect to politicians, while continuing to be critical, encouraging better civic relations. However, encouraging solidarity was considered more a concept or motivation. As times of heightened fear and threat can increase attention to social groups, and hostility to out-groups (van Bavel et al., 2020), encouraging a sense of solidarity and global unity throughout COVID-19 could encourage more constructive responses, rather than increased nationalism and fear. However, more concrete guidelines for journalists looking to encourage solidarity would be beneficial.

More practically, COVID-19 was seen as sparking increased use of co-creation, helping to focus reporting on audience needs. A gap between audiences and journalists was noted, with co-creation lessening this divide by allowing audiences to ask questions which could be overlooked or perceived as simple to those actively engaged in information streams.

> And many of the questions that come in, they are, I think, oh God, can people, don't they know that? Because it's so woah, it's a simple question why do you ask for that? Okay, you have to take it, this seriously. The simple questions. And the way some people look at their own everyday life (Editor 2, Norway)

Increased attention to audience needs was discussed across a range of interviews, though participants differed in their access to audiences, and incorporation of audience responses into reporting. While some cited platforms useful for accessing audience questions, others noted relating with the audience as important but difficult in practice. Additional to reducing the audience-journalist divide, co-creation was seen to generate more interesting and innovative reporting.

> [Public Radio] put out a what do you want to know about covid question and have gotten […] about 13 hundred questions which is like four times the number they have gotten to

139

any other question they've proposed. The platform they use to do that is Harken and it has enabled, it basically changes the workflow of the journalist because it tells the journalist what it is that the public wants to know and so, they both discovered what questions to pursue stories about, it gives them to access to new and different sources than they traditionally have and it tends to lead to more nuanced stories (Research and training, United States)

Overall, the sample reflected a general trend in the literature of the audience becoming increasingly prominent and active in the journalistic process (Steensen, Ferrer-Conill, & Peters, 2020), with constructive journalism – particularly co-creation – encouraging greater consideration of and interaction with audiences. Our interviews suggest the need for tools which enable journalists to interact meaningfully with the public, and to comprehend and respond to audiences' reception of the news. Aligned with Steensen et al. (2020), those metrics which would be most useful were those harder to measure, including emotional and behavioural responses. While many participants were conscious of and guided by audience responses, they often expressed lacking information on responses, and saw the disconnect between journalists and audiences as problematic for clear communication that best served their audience.

Previous survey research has found co-creation a less valued aspect of constructive journalism among audiences (Hermans & Gyldensted, 2019), while audience engagement in journalistic processes has raised concerns about effects on news quality (Costera Meijer, 2020). However, relevance is important in news consumption (Schrøder, 2019). Throughout COVID-19, audiences are likely to become more dependent on news media for answers and guidance, as such, co-creation provides a potential avenue to increase news engagement and relevance for audiences and respond to concerns journalists and institutions may overlook (Ball-Rokeach & DeFleur, 1976). Hermans and Gyldensted (2019) also suggest greater exposure to successful co-

140

creation may improve audience perceptions of its process and value, meriting investigation.

3.3.2.2. Awakening

The final subtheme included discussion of constructive journalism as encouraging social change, with COVID-19 discussed as a catalyst for change intra-personally, as lockdowns provided time for self-reflection and growth, and societally, through increased importance of facts, truth, and journalism, including constructive journalism. COVID-19 was noted for the possibility "it could open a new era of constructive journalism" (Editor, Norway), with increasing use of the approach by reporters and news organisations. Outside of news, constructive journalism was seen as encouraging personal reflection, growth, and well-being practices among individuals and families. The pandemic was thought to shift perceptions of global problems and changes from abstractions to real events. Some participants expressing a more active view of their role as journalists considered COVID-19 an opportunity to encourage social change.

> We don't think we can change our regime, our system, this world of big things that are abstract. Finally, life is not so abstract (Coordinator and editor, France)

> I think that is the difference between constructive journalism and other journalism. That you actually encourage people and motivate people to actually act and to act in a good way, for the society, for yourself, for the people. (Editor, Norway)

Participants differed on the extent to which they saw constructive journalism as intending a direct social impact, and how. While some emphasised including solutions or future orientation, others considered it important stories ended with audiences able and encouraged to think and act,

and actively encouraged progress toward better societies; reflecting discrepancies in the literature on constructive journalism, particularly those between Haagerup (2017) and Gyldensted (2015).

Nevertheless, COVID-19 as an opportunity to revitalise journalism is consistent with Newman et al. (2021) which suggested the pandemic an opportunity for journalists and news media to respond to audience concerns at a time when journalism and news have become more prominent and important in people's daily lives. Constructive journalism was seen to encourage a considered and responsible approach to reporting, helping balance the many roles of the journalist, and encourage better outcomes for society.

> I think constructive journalism is exactly what we have to do now. Because we have an important role to inform, to educate, but also entertain so we have different roles but I always take my role as a journalist very very seriously, because as I said in the beginning I believe we can actually change the world (Editor, Norway)

Theme summary

'What's positive in a pandemic?' reflected the role of journalists throughout the pandemic as providers of hope, and as encouraging and conveying positive responses to COVID-19. Included was covering positive stories while maintaining a critical lens, and encouraging solidarity and positive action by emphasizing the connectivity and change inspired by COVID-19. The techniques encompassed in this approach shared considerable overlap with the first theme, though having less emphasis on context and greater focus on empowerment, co-creation, and inclusiveness and diversity (Hermans and Gyldensted, 2019). While 'sober not sensational' focused on journalism's educational role, this theme had a greater focus on journalism's impact on audiences, reflective of Gyldensted's (2015) approach to constructive journalism.

4. Discussion

We interviewed journalism professionals on the benefits and applications of constructive journalism during COVID-19. Participants primarily saw their role as educating and providing hope throughout the pandemic, assisted by incorporating constructive approaches and techniques into reporting. In fulfilling this role throughout COVID-19, participants navigated multiple tensions, including between their role as educators and as entertainers, informing and not inciting panic, providing timely updates and distilling information comprehensively and contextually, and reporting positive stories while being critical and sensitive to audience needs. Participants described constructive journalism as assisting in navigating these tensions, with examples of Herman and Gyldensted's (2019) techniques present across the sample. While participants differed in which techniques they emphasized, context, solutions, empowerment, future orientation, and co-creation were considered important in informing the public about COVID-19 and related concerns without causing undue anxiety. Participants differed in their views of constructive journalism as actively encouraging social change and prosocial behaviour, consistent with theoretical differences between constructive journalism as an active or passive approach (Bro, 2019).

4.1 Considerations for current and further research

As qualitative research is an active process in which the researcher analyses the data to produce themes, no two researchers will produce the same analysis. The research team, having a background in psychology, may have produced different themes than a researcher from journalism. Additionally, due to practical constraints we cannot be sure saturation, where interviews captured the breadth of perspectives and further interviews would not contribute new information, was reached.

143

Given disputes around the exact definition of constructive journalism, the sample's heterogeneity may have impacted the analysis. While such heterogeneity enabled a broad investigation of constructive journalism and COVID-19 across roles and jurisdictions, more homogenous samples may enable more focused analyses. Similarly, the timing of the interviews, during the first months of the pandemic, may have influenced the results. Where COVID-19 has become increasingly political, other aspects of constructive journalism (e.g., depolarizing coverage) may be more emphasized. Given the sample's heterogeneity and the study's timing, the set interview questions were broad, potentially reducing the focus and length of participant's responses. While questions were asked following participant responses, more focused questions would benefit future work.

The present work drew on journalism professionals' perceptions, and therefore does not evince the impact or efficacy of constructive journalism. While beneficial in understanding how constructive journalism is perceived and implemented by professionals, claims on its efficacy for improving mood and other mental health outcomes require further research. Further qualitative and quantitative research investigating the impact of constructive journalism throughout the pandemic, including impacts on mental health, informativeness, and responses to COVID-19, would be beneficial. Longitudinal studies evaluating the influence of news media consumption over the course of the pandemic, particularly among regular consumers of constructive journalism, would be beneficial, as experiments may not reveal the impacts of sustained use. Specific techniques, including contextual reporting and communication of uncertainty, could be more amenable to experimental investigation, including randomised controlled trials.

Given the potential benefits of constructive reporting throughout the pandemic, reducing the mental health burden of news consumption and helping audiences comprehend events and

health guidelines, further development and testing of constructive techniques are warranted. Theoretically, advances have been made toward clarifying constructive journalism, however, participants varied in their understanding of the approach, particularly concerning social change. Practically, further development of constructive techniques and how journalists could employ them, as in Hermans and Gyldensted (2019), could aid journalists in adapting constructive journalism to events and contexts. Further empirical work would strengthen constructive journalism's evidence base and assist in tailoring its technical development.

4.2 Conclusion

      We offer a framework based on journalism professionals' perspectives on the application of constructive journalism to COVID-19 reporting. Our results suggest journalism professionals use and value the full range of techniques discussed by Hermans and Gyldensted (2019), though differing in their understandings and approaches to constructive journalism. The two main conceptions of constructive journalism reflected those of Haagerup (2017), with constructive journalism intended to provide a more accurate view of the world, drawing on techniques related to story selection and editorial processes, and Gyldensted (2015), taking a more active view, with journalists considering their capacity to impact and influence audiences, including providing hope and encouraging positive action. Future research could develop constructive journalism further using our findings; including empirical testing of constructive journalism techniques on audience mood, comprehension, and responses, and theoretical work looking to reconcile or clarify different approaches to constructive journalism. While differing conceptions may allow flexible uses of constructive journalism according to the context and aims of individual journalists or newsrooms, a systematic framework and set of guidelines would assist in constructive journalism training, implementation, and evaluation. Our work represents the start of such a framework, drawing on the experiences of journalism professionals throughout

COVID-19. Constructive journalism techniques may balance the impact of news on mental

health with its role to inform, particularly throughout large-scale events such as COVID-19.

Future research should test whether constructive journalism lives up to this promise, and, if so,

develop its theoretical and practical base to implement it effectively.

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Post-Script

In considering this study and its findings, some additional considerations on the sample may also be illuminating. Firstly, all participants self-identified as being interested in constructive journalism; meaning that no direct comparison was possible to journalists who did not regard themselves as using or being interested in constructive journalism. Future research could benefit from interviewing journalists outside of those identifying as constructive journalists, to understand whether there are qualitative differences in their approaches and beliefs regarding the role of journalists and the format of journalism in events such as the COVID-19 pandemic.

Another important consideration, which is briefly addressed in the next chapter, was that of the journalists' contexts. In the yet unpublished interview data on concerns and barriers to use of constructive journalism, a key consideration across interviews was the role of editors and newsrooms in either enabling or hindering the use of constructive journalism. Similarly, the national context, particularly where participants were from younger democracies with greater corruption, was seen by participants to influence the extent to which the public accepted, or the government bodies allowed, constructive journalism to be conducted.

A final consideration is that I did not have access to any data on whether the participants actually implemented the techniques or approaches they discussed, outside of their own self-report. Future work could look to triangulate what journalists purport to be doing in constructive journalism, with what they are actually including in their reporting. Such triangulation would also benefit from a comparison across newsrooms, topics, and/or national contexts, to understand the extent to which the implementation of constructive journalism is shaped by these contextual factors.

Chapter Five: Perspectives from journalism professionals on the application and benefits of constructive reporting for addressing misinformation

Beyond the COVID-19 pandemic, constructive journalism holds promise for addressing factors relevant to misinformation belief and sharing, including reducing news avoidance and misperceptions, and encouraging greater trust in news. Accordingly, the third paper investigated the perspectives of journalism professionals on the applications and benefits of constructive journalism in the context of the spread and belief of misinformation. Akin to the previous study, proposed benefits of constructive journalism included greater engagement with information and institutions, particularly where the reasons for disengagement included polarising content, apathy driven by feelings of helplessness, and negative emotion. Constructive journalism was suggested to reduce polarisation and encourage appreciation of alternative views while maintaining standards of truth. The approach was suggested to increase informativeness and the accuracy of prior beliefs, reducing the extent to which these facilitated belief and sharing of misinformation. Constructive journalism was further proposed to increase trust, a concern within misinformation and its belief and sharing, as detailed throughout the introduction. While constructive journalism was not considered a panacea, our results suggest it holds theoretical promise to address aspects of misinformation and its spread. However, as noted in the paper, the evidence-base around constructive journalism at the time of the study was relatively minimal. Consistent with study two, the findings suggest theoretical promise that would benefit from further testing, and greater clarity around constructive journalism for its effective implementation. Once more, a summary of the question, methods, results, and implications discussed in this chapter is depicted in Figure 12 below.

OVERVIEW OF MISINFORMATION AND NEWS MEDIA

IMPLICATIONS/QUESTIONS

RESULTS

METHODS

THE EFFECTS OF CONSTRUCTIVE JOURNALISM

INFORMATION CONSUMPTION AND COVID-19

PROBLEM

Lacking evidence for theorised effects

Constructive journalism reducing misperceptions and polarisation

Interviews; thematic analysis

Belief and sharing of misinformation

Unclear definitions and techniques

Constructive journalism as encouraging engagement and trust

Could constructive journalism help to mitigate spread and belief in misinformation?

CONSTRUCTIVE JOURNALISM AND MISINFORMATION

CONSTRUCTIVE JOURNALISM AND COVID-19

Legend

- Research questions
- Methods
- Results
- Implications/Questions

Figure 12. Visual table of contents for the thesis, highlighting the question, methods, results, and implications of the study.

Statement of Authorship

Title of Paper	What's positive in a pandemic? An international investigation of journalism professionals' perspectives on constructive approaches to COVID-19 news reporting
Publication Status	☑ Published ☐ Accepted for Publication ☐ Submitted for Publication ☐ Unpublished and Unsubmitted work written in manuscript style
Publication Details	van Antwerpen, N., Turnbull, D., & Scarston, R. A. (2022). What's positive in a pandemic? An international investigation of journalism professionals' perspectives on constructive approaches to COVID-19 news reporting. *Journalism Studies*.

Principal Author

Name of Principal Author (Candidate)	Natasha van Antwerpen		
Contribution to the Paper	Contributed to all aspects of the project: conceptualization, data curation, formal analysis, investigation, methodology, project administration, resources, supervision, visualization, writing, and editing.		
Overall percentage (%)	85%		
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
Signature		Date	10.02.2022

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

    i.   the candidate's stated contribution to the publication is accurate (as detailed above);

    ii.   permission is granted for the candidate in include the publication in the thesis; and

    iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Deborah Turnbull		
Contribution to the Paper	Contributed to the conceptualization, data curation, formal analysis, investigation, methodology, project administration, supervision, writing, and editing.		
Signature		Date	10.02.2022

Contribution to the Paper	Contributed to the conceptualization, investigation, project administration, supervision, writing, and editing.		
Signature		Date	10.02.2022

Perspectives from journalism professionals on the application and benefits of constructive reporting for addressing misinformation

The proliferation of misinformation in contemporary information environments contributes to increasing polarization and decreasing trust in institutions and experts, both of which encourage further proliferation of misinformation. Increasing attention has been brought to the role of news media in the spread and uptake of misinformation, and to the role of journalists and news organizations in combatting this spread. Constructive journalism is a relatively new approach to reporting which, among other aims, looks to increase audience engagement, reduce polarization, and provide a more accurate view of events. In early 2020, we interviewed 16 journalism professionals from Europe (UK inclusive), Australia, Africa, and North America across a range of formats to explore their perceptions of the use 'constructive' reporting strategies to address the spread of misinformation. We used thematic analysis to produce three themes and six subthemes in journalists' responses, 'apathy against the machine', with subthemes 'journalism as a moderator', and 'news and mental health'; 'standards as shared reality', with subthemes, 'pluralism not postmodernism', and 'this means information war'; and 'truth, trust, and the turn to transparency', with subthemes, 'facts necessary but not sufficient', and 'principles not particulars'. Constructive journalism was thought to address misinformation by increasing engagement with news and institutions, reducing polarization, providing a sense of shared reality amidst increasingly diverse perspectives, increasing trust, and reducing misperceptions encouraged by selection and reporting strategies. Constructive journalism may be a promising approach to addressing the spread and consequences of misinformation, however, empirical work is needed to evaluate the efficacy of the approach.

5. Introduction

A free and independent press is essential to democracy and an informed populace (Mughan and Gunther 2000). However, news media has seen frequent lay and academic critique for their portrayal of and influence on world events, including their contribution to misperceptions,

cynicism, and polarization (Cappella and Jamieson 1997; Pinker 2018). News media's role in this respect has been of increasing concern within our present 'post-truth era' where trust in institutions, experts, and notions of truth has declined, and misinformation is increasingly prevalent (Lewandowsky et al. 2017). Conversely, declining trust in and use of news presents a meta-level problem, as citizens' contact with governments and institutions is often filtered through news media. Egelhofer and Lecheler (2019) suggest constructive journalism as a potential alleviator of some misinformation and 'post-truth' related concerns, including re-establishing trust in journalism and news media. Constructive journalism is an emerging approach intended to be more comprehensive and diverse, and to include stories of developments and solutions. This paper explores journalism professionals' perceptions of constructive journalism and its use to address misinformation, including related concerns of trust, news avoidance, and polarization. Such perspectives provide insight into the reasons why journalists value the approach and their assumptions about journalism, the public, and the relationship between the two, thus guiding future theoretical and empirical work.

5.5 Constructive journalism

Constructive journalism has seen increasing interest; with prominent newspapers such as *The New York Times* incorporating constructive aspects into their coverage (Meier 2018). In advocating a more socially conscious, responsible, and public-oriented approach to reporting, constructive journalism bears similarity to past movements, such as civic journalism, arising from dissatisfaction with mainstream journalism (Ahva and Hautakangas 2018). Constructive journalism has been considered an umbrella term incorporating aspects of more targeted interventions such as solutions and peace journalism (Hermans and Drok, 2018). There are multiple schools of thought on constructive journalism, most notably those of Haagerup (2017)

and Gyldensted (2015). Both advocate reporting on solutions and potential developments alongside disasters and problems, but where Haagerup (2017) follows a more traditionally passive approach to journalism, focusing on changes to news selection and presentation, Gyldensted (2015) draws on positive psychology with a stronger focus on journalism's effects on audiences and society, and capacity to actively inspire and change.

Constructive journalism is not without criticisms. Primarily, these include blurring the line between journalism and activism, uncritical reporting, being fluffy or overly happy news, and a lack of conceptual clarity – a feature of similar movements in journalism's history, often contributing to their eventual disillusion (Bro 2019). While responses to the first criticism vary, proponents of constructive journalism refute claims of constructive approaches as less critical, noting that presenting solutions and developments can be, and does not negate, critical reporting (Gyldensted 2015; Haagerup 2017). Recent efforts have attempted to clarify constructive journalism, identifying as central tenets the inclusion of positive angles, developments and potential solutions, context, co-creation with citizens, increased inclusiveness and diversity, depolarizing coverage, and provision of hope and encouragement (McIntyre and Gyldensted 2017; Meier 2018; Hermans and Gyldensted 2019).

1.2 Constructive journalism and misinformation

Constructive journalism demonstrates some promise in addressing concerns of misinformation and 'post-truth'. A key consequence of misinformation is its detrimental effects on trust in institutions, including governments, scientists, and news media, which in turn contributes to belief in misinformation (van Bavel et al. 2021). News media have been criticized for contributing to cynicism, growing distrust of governments, institutions, and elites, and decreases in civic participation, as explained in the theory of media malaise (Robinson 1976). Such

criticisms point to the media's negativity bias (Cappella and Jamieson 1997), and sensationalism and 'game' formats, which have been found to decrease trust (Hopmann et al. 2015). Coverage of polarization has also been found to increase audiences' affective polarization (Levendusky and Malhotra 2016), which in turn increases motivation for sharing and believing misinformation (van Bavel et al. 2021).

In contrast to media malaise, the proposed benefits of constructive journalism reflect the virtuous circle theory – which proposes news media to improve political knowledge, trust, and civic participation, and to encourage healthy skepticism (Norris 2000). As evidence for both theories remains mixed, in the context of misinformation there is a need to identify where news media contributes to positive outcomes and healthy skepticism, rather than unhelpful cynicism, and how journalists perceive and implement such approaches; including constructive journalism (Citrin and Stoker 2018; van Ham et al. 2017).

Constructive journalism has been suggested to mitigate threats to public trust in news media engendered by political actors' use of 'fake news' to discredit genuine reports, and to build trust in news media more generally (Egelhofer and Lecheler 2019; Haagerup 2017). While audiences have expressed awareness of the weaponization of 'fake news', they still express dissatisfaction with the information environment, including news media (Nielsen and Graves 2017). Decreasing trust and increasing news avoidance limit news media's capacity to inform citizens; potentially leaving them uninformed, and more susceptible to misinformation (Scheufele and Krause 2019; Strömbäck et al. 2020; Skovsgaard and Andersen 2020). A review of the literature found trust in news media was positively associated with greater use of mainstream media, whereas lower trust was associated with greater use of non-mainstream sources (Strömbäck et al. 2020). While non-mainstream sources may include grassroots and localized information

sources, they also include partisan news sites, raising concerns of the extent to which (dis)trust and avoidance of news contribute to an uninformed or misinformed public. Constructive journalism, as a more socially responsible form of reporting, has been suggested to increase trust in news media, potentially mitigating the consequences of distrust (Mast et al. 2018). The present work therefore contributes perspectives from journalists using the approach, with an aim to understand its use and perceived benefits, and to contribute to research on the effects and implementation of constructive reporting approaches.

Reported reasons for audience distrust in news include perceived bias and poor quality – including inaccuracy, exaggeration, and sensationalized content (Newman and Fletcher 2017). Such reasons suggest citizens are concerned with the accuracy of news media and reflect a tension between news media as an important source of information, whose avoidance may leave audiences uninformed or misinformed, and as a contributor to misperceptions and polarization. Constructive approaches may increase engagement with news and thus informativeness, as indicated by survey research finding audiences valued constructive elements, particularly young, lower- and middle-educated people with low interest in news (Hermans and Gyldensted 2019). Experimental and longitudinal research also finds constructive journalism increases positive and reduces negative emotion, potentially encouraging engagement as intentional news avoidance is primarily attributed to negative mood, along with bias and sensationalism (Skovsgaard and Andersen 2020; McIntyre 2020; Kleemans et al. 2018). While Fisher et al. (2020) investigated audience solutions to low trust in news, the present work investigates perspectives of journalism professionals on their relationship with audiences and the potential for constructive journalism to increase trust and engagement in news media, and reduce misperceptions facilitated by news.

Constructive journalism is also proposed to reduce misperceptions driven by news media through greater diversity, a more balanced degree of positive and negative coverage, and greater context to facts and events, which may reduce susceptibility to misinformation (Haagerup 2017). News media contribute to prior beliefs, which influence susceptibility to misinformation (Tappin and Pennycook 2020). While reporting may be factually correct (e.g., an account of a crime), the reinforcement of narratives (e.g., immigrants as violent/criminal), particularly where misleading, can align with beliefs espoused in misinformation, increasing its fluency and thus acceptance and retention (Koch and Forgas 2012). High negative arousal produced by news content can also exacerbate motivated reasoning, contributing to polarization and belief in misinformation (Boyer 2021). Similarly, low traffic to 'fake news' websites compared to public awareness of false stories suggests news media, while intending to correct, inadvertently amplify and disseminate false stories; making understanding journalist's perceptions of their role in misinformation beneficial (Allen et al. 2020; Tsfati et al. 2020). In addition to reducing misperceptions, constructive journalism is proposed to reduce polarization, through sober coverage and increasing understanding of alternative and complex views, thus theoretically reducing motivation to share and believe misinformation.

While constructive journalism appears promising for addressing concerns at the intersection of news media and misinformation, a criticism of constructive journalism is uncertainty around its exact features, definition, and operationalization. In the analysis below participants were supportive and often enthusiastic about the potential for constructive journalism to assist in addressing misinformation and conditions for its spread – such as polarization, low trust, and low engagement – however, they expressed differing views on what constructive journalism constituted and how it could assist. While constructive journalism

provides a promising approach to address problems of misinformation from a journalistic point of view, more work is needed at a theoretical, practical, and empirical level to evaluate, encourage, and implement its use. Understanding how practitioners perceive constructive journalism in the context of misinformation can assist in guiding such development to be relevant to the concerns and needs of journalists and audiences.

2. Methods

2.1 Procedure

Participants were recruited through the constructive journalism network – an online platform for professionals interested in constructive journalism – and snowball sampling. Respondents were contacted by email, and interviews arranged in person or via phone or video conference.

Following an explanation of the study and obtaining written or verbal consent, the primary researcher conducted one group and 13 one-on-one semi-structured interviews ($N = 16$), lasting 29-140 minutes (median = 68 minutes), between January and April 2020 – approximately two months prior and two months after COVID-19 was declared a pandemic. The interviews were guided by pre-defined prompts and questions and participants' responses. Initially, questions explored participants' experiences in journalism to build rapport. Later questions addressed participants' understandings, motivations, and concerns regarding constructive journalism; responsibility, truth, and relationships to the audience; news' effect on consumers; and 'post-truth' and spread of misinformation (see Table 1 for indicative questions). 11 interviews included questions about COVID-19, reported elsewhere.

Table 1.

Indicative semi-structured interview questions.

Would you please describe your understanding of constructive journalism?
When considering the impact of news stories upon consumers, how, in your experience or perception, does news affect consumers?
There has been some discussion around the use of constructive journalism to address concerns related to democratic practices and reduced trust. Do you have any thoughts on this, and if so, would you be able to expand on them?

2.2 Analytic Approach

Interviews were digitally recorded and transcribed verbatim, using pseudonyms and replacing identifying details. Complete transcripts were used throughout the analysis. At participants' request, reported quotations were cleaned of non-semantic sounds (such as "um" or coughing), and adjusted for clarity. The audio recording failed for one interview; accordingly, the interviewer wrote and discussed notes with the participant. Following transcription, the data corpus was analyzed using thematic analysis, a flexible methodology in which data are examined to produce themes (Braun and Clarke 2013, 2019). A position of critical realism was adopted, taking as its foundation that while there is a knowable world, the ability to accurately understand and comprehend it is limited by the boundaries of human perception. The analysis took a blended theoretical and inductive approach initially, looking to produce as many themes as were of interest

in the data, which became more deductive in later stages to focus the subject matter, drawing upon pre-existing areas of focus in the literature.

Transcripts were stored and analyzed in Nvivo 12® (QSR International Pty Ltd 2012). Analysis followed the six steps described in Braun and Clarke (2013, 2019). First was familiarization with the data, including transcription, repeated readings of transcripts, and noting initial impressions and patterns. The second phase involved generating initial codes. Consistent with the blend of theoretical and inductive analysis, coding was centered around specific questions, producing as many themes and patterns as were possible and relevant. Third, codes were inspected, visualized, and sorted into themes and subthemes. The fourth phase involved reviewing themes, analyzing their content for internal homogeneity and external heterogeneity, and developing a thematic map. Fifth was writing a detailed analysis for each theme, establishing and solidifying the overall analysis, and naming themes according to content. The final phase involved writing up the data and analysis.

2.3 Ethics and quality criteria

The study was approved by the University of Adelaide Human Research Ethics Committee (HREC 01/20). While efforts were made to understand the data on their terms, each researcher approached the research from their positions and biases. None of the research team were journalists. The research team included three academic researchers in psychology, with a focus on misinformation and post-truth, health psychology and mental health, and cognition and expertise. Participants were invited to review their transcripts and a summary of the findings to verify accuracy. Throughout the analysis, the first author discussed codes and themes with the second author and recorded ongoing thoughts and developments in an audit trail.

3. Results

3.1 Participants

Participants included 16 professionals from various roles, including editors, on-ground reporters, researchers, and trainers; journalistic fields including online, print, and broadcast news; and work environments, including local and national newsrooms, freelancers, and research and training institutes. While all participants expressed interest in constructive journalism, they varied in familiarity; some had no formal training, while others had published books on constructive journalism. 12 participants were from European nations (UK-inclusive), one from Africa, one from Australia, and two from Northern America. The sample's heterogeneity enabled a broad investigation of common threads in how constructive journalism and its relation to misinformation – both global phenomena – presented across a range of jurisdictions and formats. However, such diversity begets a less focused analysis, particularly given concerns of conceptual clarity around constructive journalism.

3.2 Results and Discussion

While participants expressed concern toward misinformation and its consequences, its perceived effect on their work varied. Similarly, participants differed in their perceptions of constructive journalism in addressing misinformation. Misinformation was often related to trust in news media, experts, and institutions, with trust considered necessary within the increasing complexity of modern societies.

Overall, three themes and six subthemes were generated, depicted in Figure 1, with constructive journalism perceived to address different aspects of misinformation spread, as in Figure 2. 'Apathy against the machine' included discussion of apathy and disengagement among audiences, and the complexity of modern societies, with subthemes 'journalism as a moderator',

166

and 'news and mental health' discussing constructive journalism as increasing relevance of news content to audiences and audience engagement with news and social institutions. 'Standards as shared reality', with subthemes 'pluralism, not postmodernism', and 'this means information war', discussed criticisms of objectivity, and journalism as a source of shared reality in increasingly pluralistic and misinformation-ridden societies. Constructive journalism was discussed as renewing attention to journalistic standards, reducing polarization, and portraying a broader diversity of views. 'Truth, trust, and the turn to transparency', with subthemes 'facts necessary but not sufficient', and 'principles not particulars', discussed increased transparency, truth and framing, thematic misinformation, and trust. Overall, constructive journalism was considered to address some conditions and consequences of misinformation, including apathy and disengagement, loss of shared reality and increased polarization, and declining trust.

Given the focus of the present work, participants' understandings of constructive journalism, and concerns and barriers in and to its use, are not reported here but are available at https://osf.io/uhvg3/. While participants covered constructive journalism and its techniques as established in the literature, their understandings varied. Akin to Glasser and Ettema's (2008) analysis of ethics in journalism as a phenomenological and common-sense practice, and Wagemans, Witschge, and Harbers' (2018) analysis of journalism entrepreneurs and impact, participants expressed constructive journalism as a mindset or approach which they advocated and used but often struggled to articulate. As expanded below, similar difficulties existed in accounts of truth. While the present study focuses on perceptions of constructive journalism regarding misinformation, national context was considered an important influence on journalistic norms and audience reception. In particular, the receptivity of the audience to constructive stories, the

potential for news to resemble or integrate propaganda, and the opposition of oppressive governments to constructive reporting. More detail is available at https://osf.io/uhvg3/.
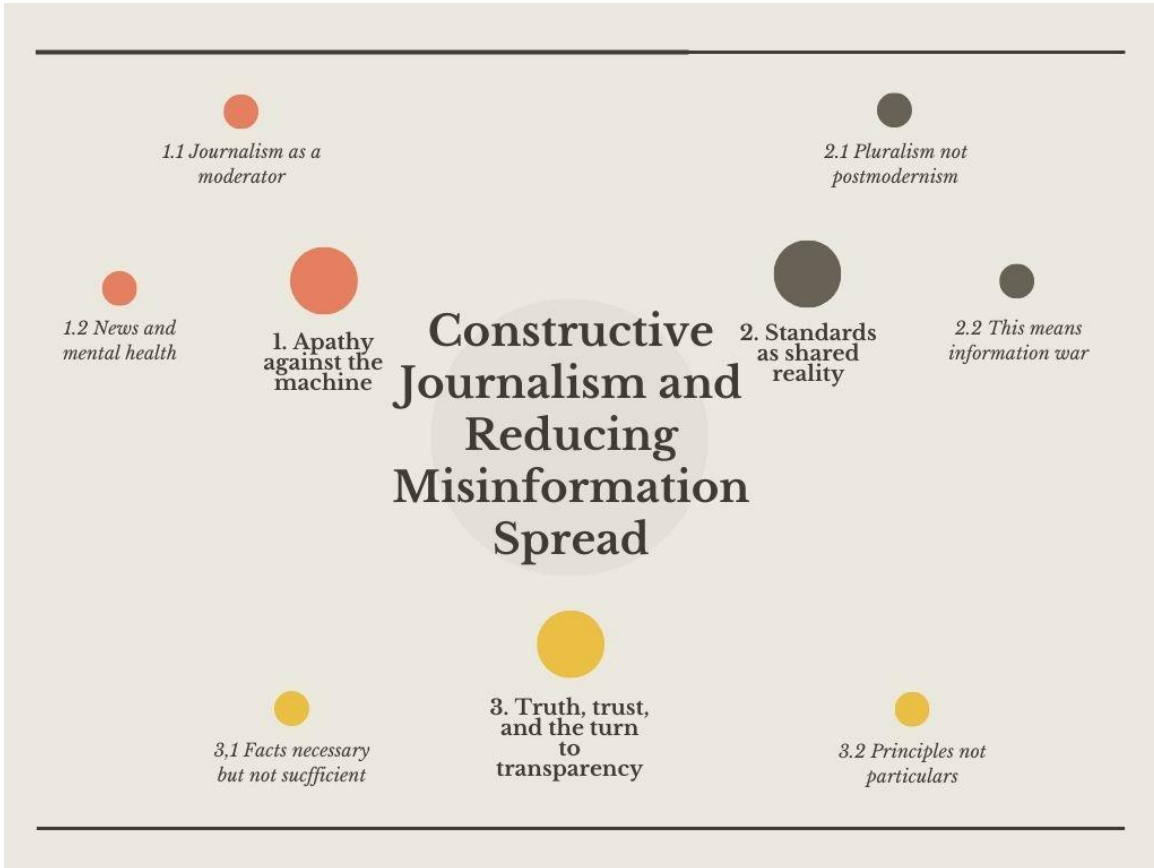
Figure 1. Map of themes and subthemes around constructive journalism and misinformation.

(Dis)engagement	Shared reality	Trust and misperceptions
• Reduce negative mood and increase positive mood • Moderate between societal structures and individuals • Increase relevance	• Clearer distinctions between fact and opinion • Clearer standards of information • Increased diversity of perspectives • Reduced polarization	• Reduce broad misperceptions • Provide more context (potentially reduce the fluency of misinformation) • Improve trust • More transparency

Figure 2. Summarized perceptions of constructive journalism's applications to misinformation.

3.3 Apathy against the machine

The first theme related to relationships between journalists, news, and audiences. Participants perceived some audience members as disconnected from broader societal systems, leading to frustration, anger, and apathy, and lowering trust and informativeness. The complexity of modern society was seen to complicate understanding of and engagement with broader societal occurrences. Such complexity emphasized the importance of trust when it came to believing (mis)information.

> I think the underlying question is who can you trust? Because our society has become so freaking complicated. (Freelance, Netherlands)

Such complexity was perceived to contribute to disengagement and apathy, leaving citizens disconnected from seemingly inapproachable systems. Participants described the negativity bias of journalism as contributing to apathy and disengagement by continually presenting adverse events about which audience members felt they could do nothing.

> If you said to a citizen, there are all these problems, and you just focus on problems, the direction of the citizen is 'what can I do?' I am just one little citizen, […] So, progressively you put him in a situation of […] I'm not able to act. (Coordinator and editor, France)

Constructive journalism, particularly co-creation, was thought to encourage engagement and a perspective toward solutions and action, rather than anger and disillusion with societal systems, by asking different questions which empowered citizens to think and act.

> People don't feel involved with the system […] when you change the question, you say, this the problem, how can you help to solve the problem, then people are not going to react

like, it's so stupid and fuck him. But people are going to think what can I do? What is my opinion about it? How can we fix this problem together (Broadcast, Netherlands)

Constructive journalism's aim to present a wider range of views and find middle ground was also thought to reach moderate audience members isolated by the polarization and extremes frequently presented in debates. Participants perceived constructive journalism to encourage greater participation and engagement on two fronts; encouraging greater understanding and access to institutions and societal processes, and reducing the mental health consequences of news, expanded below.

3.3.1 Journalism as a moderator

Participants saw journalists as points of connection, conversation, and clarification, aiding audiences in situating themselves within broader societal systems and occurrences. Constructive journalism was perceived to encourage more active engagement in and awareness of this moderating and situating role, though participants differed in their perception of how. Some drew on systems thinking, seeing constructive journalism as providing a broader understanding of systems and occurrences in society, and their connection to individuals.

The turning point happens when people see themselves as part of a larger system. […] journalism that either through words or images helps us see how we connect. Helps us see the complexity of a system, I would imagine would be a very effective way of doing constructive journalism. (Research and training, United States)

Others perceived their role as providing a voice for people, particularly in conversations and conflict with institutions where individuals felt powerless. Constructive journalism was seen as opening a conversation, going beyond the problem to hold institutions accountable for rectifying it.

We portray people who feel like they've been hitting a wall, in a conflict. Because they don't feel listened to, and we sort of try to open up the conversation with the institution. (Broadcast, Netherlands)

Participants suggested not feeling listened to was part of the disenfranchisement felt by audience members dissatisfied with societal processes, and contributed to polarization and vitriolic discourse. Many participants perceived constructive journalism as a more personal and conversational approach, which encouraged a greater feeling of involvement and recognition from sources and audiences, particularly in portraying groups or perspectives often excluded from mainstream reporting. Similarly, van Ham et al. (2017) point to increasing disparity between class and educational divides regarding trust in news and governance. Constructive journalism appears promising in reducing this divide and increasing engagement, with Hermans and Prins (2020) finding constructive elements appealing to millennial audiences – those most likely to avoid or dislike news.

3.3.2 News and mental health

Participants discussed repeated exposure to negative emotions and problems in the news, often without solutions or actionable responses, as increasing depression, anxiety, apathy, negative perceptions of others, and "making people worse" (Editor, Norway). While varying in awareness of research on news consumption and mental health, many discussed this impact as pervasive, due to the negativity bias and problem-centric culture in journalism.

It's really important to understand that it's not episodic, it's thematic. So it's not one news story about one problem that causes these consequences, it's the continuous and excessive reporting of problems over a long period of time without balanced understanding of what's being done about them. […] it can make [audiences] feel anxious, pessimistic, and

depressed. […] so [audiences] develop a defeatist attitude where these problems of the world just seem too big to solve, and that leads to a reduction in our helpful behavior, but our reduction in our helpful behavior can also be explained because of an increase in feelings of contempt and hostility towards other people (Research and training, United Kingdom)

Reduced prosocial behavior and elevated feelings of hostility resulting from news consumption were discussed as worsening responses to societal problems. Constructive journalism's presentation of positive events was considered a cultural shift in journalism, which looked to mitigate these effects and use journalism's influence to encourage engagement, empathy, tolerance, and mutual understanding and cooperation. As in the differing schools of thought on constructive journalism, some participants saw the inclusion of solutions and developments as more accurately portraying the world, considered a mix (or balance) of good and bad, akin to Haagerup's (2017) approach, while others, like Gyldensted (2015), perceived constructive approaches as actively influencing audiences and society for the better.

You have to tell them the truth. Either if it is sad, or it is good. But you have to have a balance with both things (Editor, Norway)

From spreading bad mood, depression, dark thoughts about our future, to optimism, critic-thinking, to a sense of belonging. It is incredible the power of this activity. […] Journalists can make a community become tolerant, respectful, positive, peaceful. (Reporter, Spain)

Overall, participants expressed ambivalence over journalism's influence, seen as leading to depression, anxiety, apathy, negative perceptions of others, and disengagement from broader societal occurrences, or greater engagement, empathy, tolerance, and mutual understanding and cooperation. Constructive journalism was seen to encourage more conscious and socially

172

beneficial uses of journalism's influence, though this required a 'balanced' approach, neglecting neither problems nor positivity. Consistent with criticisms of constructive journalism, some participants were wary of including solutions and positive developments, citing potential activism, though most viewed these techniques as important, beneficial, and separate from activism. While both proponents of constructive journalism refute criticisms of activism, addressing the disjuncture between Haagerup's (2017) and Gyldensted's (2015) approaches would help clarify how journalists use and view constructive techniques.

While many participants emphasized the ability of constructive journalism to increase prosocial behavior, findings from empirical work remain mixed (Hermans and Prins 2020). However, constructive journalism increasing positive emotion and decreasing negative emotion is likely the most robust finding in the field to date, though most studies focus on constructive journalism as the inclusion of positive emotions and solutions (see for example Baden et al., 2019). As negative emotion is the most reported reason for news avoidance (Skovsgaard and Andersen 2020), the effect of constructive journalism on mood appears promising in increasing engagement. However, experimental work has found engaged citizens to read negative stories despite expressing a preference for positive stories (Trussler and Soroka 2014). Longitudinal research may therefore aid in assessing whether constructive approaches facilitate more sustainable news intake, as participants suggested.

3.4 Standards as shared reality

The second theme pertained to journalism as an influential provider of shared reality, though with difficulty in an increasingly diverse and polarized society more skeptical of objectivity. Standards were considered a response, making clear distinctions between facts,

knowledge, and opinion, and the prerogative of journalism to report accurately and truthfully, and to mitigate personal bias.

> The awareness of fact vs. opinion, subjective vs. objective is so important, so crucial (Freelance, Netherlands)

> That's why we have some sort of shared understanding of truth. If it was on the news, it's probably tru- it's not total bullshit. […] But if people use only media that's very activist and biased we lose a shared sense of truth (Broadcast, Netherlands)

Some participants saw constructive journalism as reviving commitment to the standards of journalism "because it's a new term, everyone gets more conscious about" (Broadcast, Netherlands). Concerns of shared reality predominantly involved a lack of distinction between opinion and fact, and proliferation of false and misleading information, particularly across social media. The contribution of constructive journalism to each is further expanded in the subthemes below.

3.4.1 Pluralism not postmodernism

This subtheme encapsulated tension between freedom of opinion within democratic society, the need for common truths, and responses to challenges to objectivity. Participants described truth as a bedrock value of journalism, yet one that was contentious and difficult to articulate, being subject to different views and opinions.

> Truth is a bedrock value of the journalists that I know. It is the first place they go. I mean it is the last thing they will sacrifice. And the thing that I always say to them, is you need to look at truth in context. Because, your truth and my truth might not be the same and so,

174

[…] I put a higher value on understanding that is grounded in truth. So, I see truth as essential, and not sufficient. (Research and training, United States)

Other participants expressed similar difficulties in the alignment of truth as a bedrock value both personally and professionally, yet something highly shaped by context and perception. Many saw constructive journalism as making these difficulties more explicit, and some considered the inclusion of context, portrayal of diverse perspectives, and clear distinctions between fact and opinion as a response, with truth as a guiding, if unobtainable, principle. Some participants also saw constructive journalism as taking an active role in encouraging a search for truth, though this differed between participants who viewed constructive journalism as more active or passive. Overall, participants' responses to challenges of truth and objectivity were akin to the reformulated affective objectivity and transparency discussed by Beckett and Deuze (2016).

The role is to make clear that actually there will always be many truths, depending on each person we talk with. But we have to make it understandable that an interpretation of a fact is not a truth, it is only a perspective. The role is to avoid fanatics of the truth. The purpose is to spread that we have all of us, to seek the truth, together. (Reporter, Spain)

Participants also discussed avoiding extreme or 'fanatic' views, which they considered polarizing and untrue to most audiences, resulting in disengagement or false perceptions of opposing views. Constructive journalism was seen to shift from simplified debate formats pitching extreme views against each other, to understanding different perspectives. Again, participants differed in their views of journalism as actively encouraging a resolution between differing opinions, or simply portraying the diversity of perspectives, reflective of broader tensions between constructive journalism, objectivity, and social agency (Aitamurto & Varma, 2018).

175

Constructive journalism's focus on depolarization appears promising in reducing misinformation, with polarization encouraging greater in-group identification and out-group degradation, and sharing of ideologically congruent misinformation (van Bavel et al. 2021). Polarizing coverage and polarization online also increase polarization among audiences and consumers (Levendusky and Malhotra 2016), and audiences have referenced polarizing coverage as reason for news avoidance (Skovsgaard and Andersen, 2020). However, as out-group and moralizing language increases sharing and engagement online, further research should investigate how constructive approaches impact polarization among audiences, and their engagement with news (Rathje, Van Bavel, and van der Linden, 2021).

Participants also emphasized the importance of portraying expertise over interpretations according to each story's demands.

> Even though there can be just truth in what happened, everyone's interpretations can really vary. […] but it, in some story types, leaning on expert advice and privileging that over just sort of like general perspectives is really important (Reporter, Australia)

3.4.2 This means information war

Participants expressed ambivalence regarding contemporary democratic society and modern media landscapes, which were thought to increase informational agency and diversity, alongside competition with misinformation and disinformation, and obscuring of fact and truth by excess information, opinion, and influence. Consistent with previous work, journalists often described misinformation in war-like terms (Tsfati et al., 2020), including concern from some participants on the weaponization of "fake news" and attempts to discredit legitimate journalism.

> The audience has become, in a way, aware that there is something called fake news and now I notice at least in Croatia that they use it as a pun, a word they use for everything.

176

Oh, that is fake news. That is fake news. And, especially when they watch the news and when journalists produce them, which is really really sad (Broadcast and research, Croatia)

Journalists were seen to combat misinformation by providing 'the facts', however, this required trust in journalism. Combatting misinformation was considered complicated by competing voices, including social media influencers, and journalism as less emotionally resonant compared to social and emotional connections. Journalism's influence was also thought hindered as a higher prevalence of free information reduced subscriptions. While participants discussed fact-checking and teaching critical thinking and digital literacy skills – seeing this as part of constructive journalism's moderating role – the speed of misinformation and its spread were considered significant hurdles better addressed by social media and technology companies with more resources.

Tech companies like Facebook, Twitter, TikTok, all of them really need to be responsible for removing [misinformation] off the internet because […] Their resources far exceed what any media company can do (Reporter, Australia)

Additionally, moderating, fact-checking, and educating processes were thought to require trust and engagement with journalists and were dependent on specialty and available resources. Trust in journalism and digital literacy were considered important for providing true information in place of conspiracies or false beliefs. However, participants acknowledged those high in both were still susceptible to misinformation.

It wasn't true. No, but, very, a good journalist, she said, 'oh I believed in it' so that is a big problem, […] And people believe in it but they if they don't trust news where should [they] find the facts? (Editor, Norway)

Despite these difficulties, journalism was discussed as needing to "keep up the standard because we have a very crucial role to keep up democracy." (Editor, Norway). The role of constructive journalism differed among participants here, some seeing it as encouraging greater standards of journalism and a sense of shared reality, while others thought constructive journalism indistinguishable beyond good journalism regarding standards and facts, though what constituted good journalism was considered contentious.

> I don't think that a constructive story can help the audience understand better what is true and what is false. (Broadcast and research, Croatia)

The above participant recognized value of constructive journalism in addressing other aspects of journalistic culture, such as an overemphasis on problems and disasters, but did not consider this benefit to extend to distinguishing between true and false information, or the particular concerns of misinformation spread.

3.5 Truth, trust, and the turn to transparency

Given criticisms of objectivity and difficulties with truth, independence and transparency were considered increasingly important in adhering to journalistic standards and encouraging trust.

> Of course [journalism] isn't [objective], because it's a lot to do with your personal beliefs. Is it independent, of course, that's another question (Broadcast, Netherlands)

Some participants discussed constructive journalism as a more personal form of journalism, with its explicit focus on what to attend to and select as a basis of reporting encouraging transparency and awareness of subjectivity and personal bias.

> I think [constructive journalism] forces you, to be more open […] You cannot hide behind that frame of, I'm the objective journalist, I have no opinion, I am just writing down what

I see. Because what you see is always colored, so it's better to just admit it than to hide

behind it. (Freelance, Netherlands)

Practically, being transparent included linking to source studies and articles and

acknowledging own biases or perspectives where reasonable. Such comments suggest a need for

further theoretical development on transparency and constructive journalism – participants often

associated them, though, to the authors' knowledge, no explicit relation of constructive journalism

to transparency exists. Constructive journalism was further seen to address concerns of truth and

trust in two respects, discussed in the subthemes below.

3.5.1 Facts necessary but not sufficient

While facts were considered a bedrock of reporting, participants noted the influence of

underlying narratives in reporting, and facts without context, as potential contributors to

misinformed perceptions.

It can be misleading if the facts, if the bare facts, don't explain how it got to be that fact

(Freelance, Netherlands)

The negativity bias of much news, despite factual correctness, was discussed as promoting

misperceptions of the world. As in 3.3.2, this was considered a cultural or thematic issue.

Even if, every single story that was published in the news was true, even if absolutely every

piece of information we got was fact-based and verified, the fact is, we would still be

horribly ill-informed about the world. Because the problem isn't episodic, it's thematic.

(Research and training, United Kingdom)

Constructive journalism was seen to mitigate this negativity bias in news culture, providing

a more accurate representation of the world. Similarly, the broader scope of constructive

journalism, including developments, solutions, and context, was seen to mitigate thematic misinformation created by traditional uses of frames, selective choice of facts, and lack of context.

> We are creating problems because we put the frame of the problem, and we put the person, as victims, and only victims. […] it happens for a lot of things and the way we treat the information is quite important. (Editor, France)

As iterated earlier, some researchers and commentators have suggested mainstream news media contribute to a misinformed audience (Allen et al. 2020; Rosling et al. 2018). Additionally, misinformation increasingly consists of misuse of context, rather than explicitly false content (Wardle 2019). Pre-existing beliefs, and the valence of and arousal induced by media content, also influence belief in misinformation (Tappin and Pennycook 2020; Boyer 2021). Providing greater context around events and highlighting biased narratives in news media therefore may be promising strategies for addressing misperceptions resulting from news reporting. Again, this benefit requires empirical investigation, although existing experimental work suggests that greater context can reduce belief in misinformation maintained through cognitive biases (e.g., the continued influence effect; Lewandowsky et al. 2012).

Some participants saw changes to societal structures, increased globalization, and criticisms of objectivity as prompting a need for common vision or truth in news narratives, which constructive journalism could assist with, though not all advocated this – again pointing to a disjuncture between constructive journalism as active or passive. Overall, constructive journalism was considered to promote a cultural change, contributing to a better informed and educated society.

3.5.2 Principles not particulars

Participants also discussed tension regarding trust and journalism's role as a watchdog, potentially increasing distrust by exposing corruption and faults within various systems and institutions.

> The interesting thing when it comes to trust in institutions is our work often creates distrust in institutions. Because we are also aiming at uncovering bad intentions in bureaucratic, organizations and companies. So they add to mistrust. And that's not actually the goal (Broadcast, Netherlands)

Constructive journalism was discussed as addressing this tension between the need to encourage "skepticism towards power" (Broadcast, Netherlands), and maintaining a level of trust or faith in truth and institutions. Constructive journalism was seen to shift trust from individuals and specific institutions to broader principles, processes, and standards which held people and institutions accountable.

> Ideally, that would mean not a general mistrust in truth but a re-establishment of faith in truth. (Broadcast, Netherlands)

In this sense, trust in the principle of truth, and reporting based on the principle of truth, to bring about justice, was seen to replace more concrete objects of trust, such as specific institutions. Notably, the relation of journalism to institutions and trust was influenced by the national contexts of participants. Particularly within young democracies or developing nations, constructive approaches could be less well received by governments, where constructive reporting could be seen as challenging official narratives, or the public, with some audiences perceived to find constructive stories falsely hopeful. As suggested in previous works, constructive approaches may therefore need evaluation specific to their unique contexts (Rotmeijer, 2018).

Concerning journalism itself, transparency regarding the journalistic process, including open systems stating journalistic aims and principles, was seen to increase trust.

> I've seen early fledglings attempts at […] some kind of system that grows up that news organizations can opt into. That when the public sees, knows, it is abiding by a certain set of principles that guide its work (Research and training, United States)

> Trust in particulars – such as individuals, institutions, or instances – was thus seen to transition to trust in defined principles and values, encouraged by good journalism and greater transparency. Constructive journalism was considered part of a societal shift toward transparency and approaches which looked to encourage and understand positive outcomes, both, consistent with reviews, considered to foster greater trust (Fisher et al. 2020). However, it is questionable whether such practices are effective among those with low trust in news to begin with (Fisher et al. 2020). Increased audience engagement throughout the COVID-19 pandemic may provide opportunity for news outlets to reach low-trusting audiences (Newman et al. 2021).

While participants, alongside proponents of constructive journalism, considered the approach to increase trust, relatively little research has investigated these claims. Their et al. (2019) found solutions journalism to increase trust under experimental conditions, however, further empirical work is warranted. As news media contributes to trust across multiple aspects of society, future research could investigate trust at multiple levels, including in content, producers, institutions, democratic processes, and fellow citizens.

4. Implications, future research, and limitations

An open theoretical question is whether constructive journalism is considered active or passive; a difference that influenced practitioners' views on constructive journalism regarding misinformation and their audiences. Greater clarity and reconciliation on these differing views,

and further research into the practicalities and impact of implementing constructive journalism, would be beneficial for professionals and news consumers. One practical benefit of constructive journalism is the flexibility afforded when adapting to different newsrooms and locations.

Regarding empirical work, current research on constructive journalism has primarily involved solutions and positive emotions (Hermans and Prins 2020). However, participants suggested many benefits of constructive journalism to extend from additional features (including context, diversity, or co-creation). Research could test these features and their combinations on proposed outcomes including trust, emotion, intention to engage with news, polarization, and comprehension, including across various news formats. Given the argument for constructive journalism as a cultural and thematic shift, experiments would be well complemented by longitudinal research; particularly as changes to trust and polarization may be gradual.

Given, the nature of qualitative research, no two researchers will generate the same themes from the data. The salience of themes may therefore have been influenced by the research team's expertise. Additionally, due to practical limitations, we cannot be sure saturation – where new interviews would not contribute further information – was reached. The heterogeneity of the sample may have influenced results but comes with the benefit of providing insight into constructive journalism and misinformation across various jurisdictions. The findings of the present study are not themselves evidence of constructive journalism's influence, however, they provide insight into understandings of constructive journalism and its benefits among journalism professionals. These understandings are a useful starting point for developing theory, further empirical investigations, and practice.

5. Conclusion

Professionals using constructive journalism considered the approach beneficial in addressing concerns related to news media and misinformation, including lack of trust, audience disengagement, polarization, and misperceptions. Many of the perceived benefits align with audience criticism reported in the 2021 Reuters Digital News Report, among them the finding tht various populations, including young people, women, ethnic minorities, and political partisans, feel unfairly represented in news media, suggesting more accurate and engaged portrayals may help audiences perceive news as more relevant and true to themselves (Newman et al., 2021). While promising, there are open theoretical questions regarding the nature of constructive journalism that future research may look to resolve. The distinctive approaches of Haagerup (2017) and Gyldensted (2015) were reflected in differences among the sample, suggesting a need for clarification or reconciliation of the extent to which constructive journalism involves an active process. Such clarification would help to explicate how objectivity and transparency are integrated into a constructive journalism approach and would offer clearer practical guidelines. A more unified theoretical framework would not only assist journalists looking to implement constructive approaches, but also researchers looking to test the proposed benefits of constructive journalism. Overall, constructive journalism may ultimately contribute to a more meaningful, accurate, and actionable view of events and the world; the promise of which would benefit from empirical validation.

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Chapter Six: The effects of constructive journalism techniques on mood, comprehension, and trust

In the final paper, I build on studies two and three by directly testing the effects of constructive journalism on consumer trust and comprehension in a randomised controlled experiment. While the experiment did not directly address the influence of constructive journalism on misinformation belief, comprehension is a precursor to belief formation[28]. The findings also contribute to a general evidence base demonstrating how the approach can impact on consumer cognition, which could assist in designing future experiments more tailored to the problem of misinformation. Consistent with previous studies, I found participants in the Constructive condition to report higher positive and lower negative emotion, though also scoring lower on comprehension, and reporting no discernible differences in trust until accounting for mood and interest. The lack of difference in trust scores was also present when analysing the first article only, before participants were aware trust in the article information was being measured. While the results replicate and strengthen claims that constructive journalism reduces the emotional and mental health burden of news consumption, further research is needed to ensure this relationship does not come at the expense of trust and comprehension. A summary of the questions, methods, results, and implications discussed in this chapter is presented in Figure 13 below. Following submission of this thesis, the paper was published in *Journalism*. The revised work can be found in Appendix 2.

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[28] There is also some argument that comprehension and belief are simultaneous processes; and that it is only after we have comprehended and had time to process and decide to reject information as false that we cease to believe it (Gilbert, 1991; 1993). See Mayo (2019) for how distrust impacts this process.
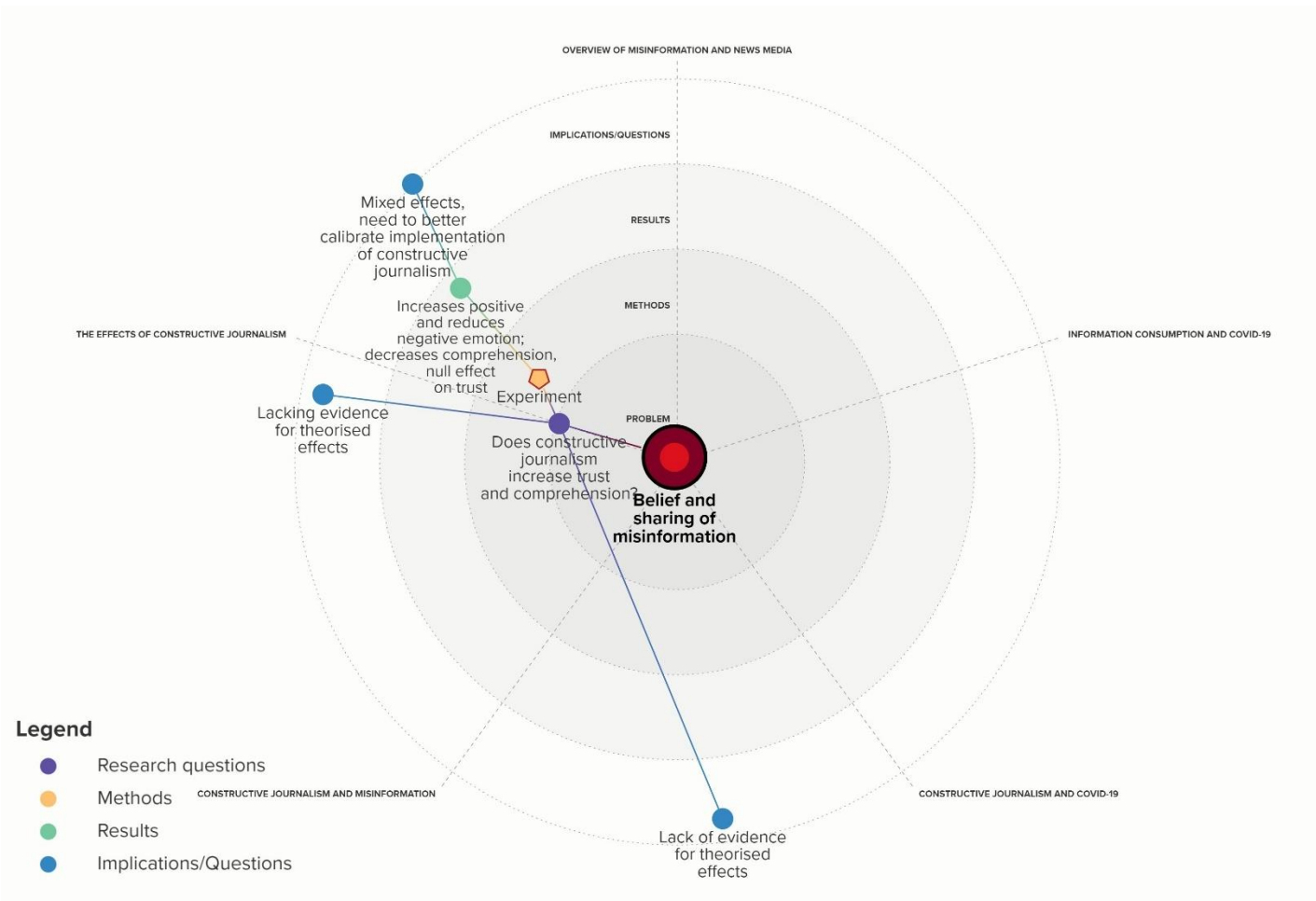
Figure 13. Visual table of contents for the thesis, highlighting the question, methods, results, and implications of the study.

Statement of Authorship

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Contribution to the Paper	Contributed to all aspects of the project: conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, supervision, operationalization, validation, visualization, writing, and editing.		
Overall percentage (%)	80%		
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
Signature		Date	10.02.2022

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

i.   the candidate's stated contribution to the publication is accurate (as detailed above);

ii.   permission is granted for the candidate to include the publication in the thesis; and

iii.   the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Rachel A. Searston		
Contribution to the Paper	Contributed to the conceptualization, formal analysis, investigation, methodology, project administration, resources, operationalization, supervision, validation, visualization, writing, and editing.		
Signature		Date	10.02.2022

Name of Co-Author	Deborah Turnbull

194

Contribution to the Paper	Contributed to the conceptualization, investigation, methodology, project administration, supervision, validation, writing, and editing.		
Signature		Date	10.02.2022

Name of Co-Author	Liesbeth Hermans		
Contribution to the Paper	Contributed to the methodology, formal analysis, resources, and editing.		
Signature		Date	10-02-22

Name of Co-Author	Petra Kovacevic		
Contribution to the Paper	Contributed to the resources and editing.		
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The effects of constructive journalism techniques on mood, comprehension, and trust

Natasha van Antwerpen[a]*, Rachel A. Searston[a], Deborah Turnbull[a], Liesbeth Hermans[b], and Petra Kovacevic[c]

[a]*School of Psychology, University of Adelaide, Adelaide, Australia*

*natasha.vanantwerpen@adelaide.edu.au

The University of Adelaide, Hughes North Terrace,

Adelaide SA 5005 Australia

[b]*Constructive Journalism Media Research Centre, Windesheim University of Applied Sciences, The Netherlands*

[c]*Journalism Studies, Cardiff School of Journalism, Media and Cultural Studies, Cardiff University, Cardiff, United Kingdom.*

Contributor's Statement

The effects of constructive journalism techniques on mood, comprehension, and trust

The role of news media in the perpetuation of misinformation has faced increasing scrutiny as trust in news has decreased. Concerns have also been raised about the negative influence of mainstream news media on mental health as news avoidance has increased. Constructive journalism is proposed to increase engagement with and trust in news media, reduce the mental health impact of news consumption, and provide a more accurate view of the world. However, constructive journalism studies primarily investigate the inclusion of solutions and positive emotions in news stories, to the exclusion of other constructive journalism techniques. Additionally, few studies have investigated constructive journalism's effects on trust and comprehension. The present study used a randomised controlled repeated measures experimental design to investigate the effects of a comprehensive set of constructive journalism techniques on mood, comprehension, and trust among 238 Australian participants. Participants who read constructive articles reported higher positive emotion, and lower negative emotion, compared to participants who read the same articles without constructive features. However, participants in the constructive condition demonstrated worse comprehension than participants in the control, an effect partially mediated by negative emotion but not effort. No significant differences in trust in journalism as an institution or in article content were present between groups. However, when accounting for interest, constructive journalism demonstrated a significant negative effect on trust in the information, though positive where it increased mood. Further research is needed to calibrate techniques which balance the positive effects of constructive journalism with its ability to convey information.

1. Introduction

Journalism – along with numerous institutions in Western democracies–- is going through a crisis of trust (Fisher et al., 2020). Despite trust increasing at the onset of the COVID-19 pandemic in 2020, the Reuters Digital News Report found 50% of a global sample across 46 markets to report trusting the news media they use, and less the news media in general (Newman et al., 2021). While the relationship between trust in the news and use of news sources appears modest, low trust in news has been associated with use of non-mainstream sources, including those spreading false and/or partisan news (Strömbäck et al., 2020). While trust in mainstream news sources is declining, concern about the negative impacts of news media on mood and mental health is rising – particularly throughout COVID-19 (Boukes an Vliegenthart, 2017). Similarly, concerns have been raised regarding misperceptions driven, intentionally or otherwise, by selection and

editorial processes in journalism (Haagerup, 2017). Constructive journalism has been proposed to address concerns news media is perpetuating misperceptions and negatively impacting mental health. However, the evidence base for constructive journalism techniques and their impact is still relatively sparse. We contribute to this growing literature by probing the effects of constructive journalism techniques on consumer mood, comprehension, and trust, using a randomised controlled repeated-measures experiment.

1.1 Constructive journalism

Constructive journalism is a relatively new approach to reporting, which aspires to be socially responsible and to report accurately and contextually on matters of societal importance without sensationalisation or overemphasis on the negative (Gyldensted, 2015; Haagerup, 2017). Additional to a response to news media's negativity bias, constructive journalism critiques traditional news approaches, including top-down communication of news, and lack of diversity and nuance in views portrayed in mainstream media (Hermans and Drok, 2018). Constructive journalism has emerged among similar movements, including civic journalism, solutions journalism, and peace journalism, which share aspects of constructive approaches (Bro, 2019). While efforts have been made to consolidate theories, two distinct schools of thought on the guiding principles of constructive journalism remain articulated in the work of Gyldensted (2015) and Haagerup (2017). Gyldensted (2015) draws on positive psychology, including the PERMA model (McIntyre and Gyldensted, 2017), and Fredrickson (2001)'s broaden and build theory of positive emotion, and has greater focus on how news affects audiences and society, often viewing journalism an active and influential role in society. Haagerup's (2017) approach focuses on the selection and editorial processes of journalism, including work on cognitive heuristics and biases, with greater focus on portraying "the most obtainable version of the truth" (Rosling, Rosling, and

Rönnlund, 2018). Efforts to clearly define constructive journalism include identification of six techniques by Hermans and Gyldensted (2019). *Solutions* includes adding a solution-oriented frame to coverage of problems. *Future orientation* incorporates the question 'what now?' and considers paths to potential futures. *Inclusiveness and diversity* involves working against polarising dynamics, and including a wider variety of voices and perspectives. *Empowerment* involves questions and angles which address possible resources, solutions, collaborations, and common ground, and move beyond victim or disaster frames. *Context and explanation* ('the Rosling') involves providing context and explanation to news, including through visualisations and data. *Co-creation* involves engaging with and empowering the public and co-creating news content.

Constructive journalism has been subject to some criticisms, including unclear definition, proximity to activism, and being too positive/insufficiently critical (Bro, 2019). Proponents of the approach have refuted constructive journalism as too positive, noting critical reporting is still important and not precluded by inclusion of solutions and developments; nor does such inclusion require journalists to become activists (Gyldensted, 2015; Haagerup, 2017).

Despite its critics, constructive journalism has gained ground, with prominent outlets including *The Guardian* and *The New York Times* incorporating constructive techniques into their reporting (The Guardian; The New York Times). Irrespective of the definition of constructive journalism, several empirically testable claims can be gleaned from extent theoretical work. We focus on testing claims that constructive reporting techniques —as outlined by Hermans and Gyldensted (2019) — increase trust in news, improve mood (or temper news' negative impacts on mood), and increase the accuracy of consumers' views about the world or their comprehension.

1.2 News media and mental health

Analyses of news media suggest a disproportionate tendency toward selecting negative stories (Soroka, 2012). Such selection bias can lead to negative emotion and negative mental health consequences caused by consuming news (Baden, McIntyre, and Homberg, 2019). Experimental and longitudinal research has found consumption of news media increases depression, helplessness, distrust, and anxiety, and reduces perceptions of others as altruistic and well-meaning, leading consumers to focus upon their own security and less upon others, and to experience apathy, denial, and fatalism (Baden, McIntyre, and Homberg, 2019; Boukes and Vliegenthart, 2017; de Hoog and Verboon, 2019; McIntyre, 2015). Throughout COVID-19, news media's impact on mental health has been highlighted, with numerous studies finding news exposure associated with anxiety and depression (Gao et al., 2020; Ko et al., 2020; Yao, 2020). Besio and Pronzini (2014) also theorise news and media to play a significant role in diffusing values and moral expectations, with negative news providing less examples of positive behaviour.

As evidence of negative mental health consequences of traditional news reporting methods mounts so does support for constructive journalism, as a tool for increasing positive emotions among consumers and reducing the negative consequences of news consumption (Baden et al., 2019). Longitudinal (McIntyre, 2020), and experimental work has found participants assigned to read constructive news report increased positive emotion, and reduced negative emotion, relative to participants in control conditions (Baden et al., 2019; Hermans & Prins, 2020; McIntyre, 2015; McIntyre & Gibson, 2016; McIntyre, 2019). However, most studies have operationalised constructive journalism by including solutions or content with a positive valence; while key constructive journalism elements, a wider range of techniques remain to be tested experimentally (Hermans & Prins, 2020). Accordingly, in the present work we incorporated a broader range of

constructive journalism techniques by developing news articles containing solutions, positive emotions, a future orientation, inclusiveness and diversity, and context. We expected the present study — with a more comprehensive and higher fidelity constructive journalism manipulation — to replicate these previous findings, namely that: consumers reading news articles with constructive features will report more positive emotion (Hypothesis 1), and less negative emotion (Hypothesis 2), than those in the Control condition.

1.3 Constructive journalism and comprehension

Concerns have also been raised about news media perpetuating misinformation and consumer misperceptions. Many such concerns focus on journalism's negativity bias— even if news is factual, emphasis on negative stories contributes to distorted perceptions of a more dangerous and less developed world than reasonable evidence would support (Rosling et al., 2018). Constructive journalism, through providing greater focus on developments, solutions, and responses to disasters, is considered to provide a more accurate or balanced view of the world (Haagerup, 2017).

The inclusion of context is also proposed to reduce misperceptions resulting from reliance on heuristic evaluations (Haagerup, 2017). However, we are naturally predisposed to respond and attend to threats, with negative emotion repeatedly found to draw increased attention, and therefore increase processing and retention of negative information (Lang, 2000; Soroka, Fournier, and Nir, 2019). Lang's (2000) Limited Capacity Model of Mediated Message Processing (henceforth Limited Capacity Model) also proposes the ability to encode, store, and retrieve information is impeded by limited mental resources, suggesting the ability to properly remember information may be limited where information takes more effort to process.

To our knowledge, the only previous study on constructive journalism and comprehension was conducted with children, using televised news (Kleemans et al., 2018). The study found mixed results; while recall of news content was higher in the control condition, children better recalled broad details in the constructive condition (Kleemans et al., 2018). Neither effect was mediated by negative emotion. The authors called for further research into the effects of constructive journalism on comprehension, including whether such effects were a result of differences in effort exerted across conditions.

Accordingly, we expected an effect of constructive reporting techniques on comprehension but, considering prior findings, did not have strong predictions about the effect's direction (Hypothesis 3). We did, however, expect the effect of constructive journalism on comprehension to be mediated by negative emotion (Hypothesis 3A) and effort (Hypothesis 3B), consistent with predictions of the Limited Capacity Model (Lang, 2000) that negative emotion can increase, and effort decrease, retention.

1.4 Constructive journalism and trust

As recent reviews have established, despite ongoing discussion of trust in journalism, the field has yet to agree on fundamental questions, including how and at which level to measure trust, to what extent trust in news impacts its use, or whether trust in news is desirable (Fisher, 2016; Fisher et al., 2020; Strömbäck et al., 2020). Complicating trust in news media is a shift to high-choice information environments, with a wider variety of sources and audiences increasingly able to tailor their news consumption, often selecting for attitude-consistent information. Such environments increase competition, including from alternative and partisan sources, "fake news" sites, and direct communication by politicians/public figures; many of which attack the credibility of mainstream news media (Strömbäck et al., 2020). Trust is similarly complicated by unclear

definitions, differences in trust across various platforms – for example traditional media (e.g., print or television) compared to online or social media – and differences between trust in journalists, outlets, or news media as an institution (Fisher, 2016; Strömbäck et al., 2020). Despite these challenges, trust is considered important for journalists and news media to inform the public, and its decrease has been of concern (Fisher et al., 2020; Strömbäck et al., 2020).

Strömbäck et al. (2020) in reviewing the literature found a moderate correlation between news use and news trust, with a repeated pattern of low trust in news being associated with using alternate and potentially partisan sources. Such media diets may facilitate exposure to and sharing of misinformation. Additionally, trust in journalism relates to trust in other aspects of society. Though unable to draw causal inferences, Hanitzsch, Van Dalen, and Steindl (2017) found evidence of a 'trust nexus' between news media and politics. While social media has increased access to institutions/governments, they are often still accessed and assessed via the news (Citrin and Stoker, 2018). Decreasing trust may reduce the capacity of governments and institutions, contributing to cycles of distrust where such reduction hinders positive change, reducing trust, etc.

In a mixed-methods investigation of audience perceptions, Nielsen and Graves (2017) found reasons for low trust in journalism to include bias, political and commercial; and poor journalism, including exaggeration or sensationalisation, inaccuracy and low standards, and conflicting information. A survey of audience perceptions in Australia – the population sampled in this study–- found suggestions to improve trust in news included reducing bias and opinion from journalists, declaring conflicts of interest and political standpoints, and increasing in-depth reporting (Fisher et al., 2020). While initiatives varied across demographics and existing levels of trust in news, techniques proposed in constructive journalism such as providing context and greater diversity of views, appear promising for increasing news trust.

Concerning misinformation and post-truth, Egelhofer and Lecheler (2019) suggest constructive journalism as a potential approach to increase trust in news, as it could make the distinction between genuine journalism and 'fake news', often negative and sensationalised, clearer. Proponents of constructive journalism, and news agencies interested in the approach, have also emphasised its ability to increase trust (Constructive Institute, 2020; Ross, 2020). Theoretically, constructive journalism's commitment to societal benefit and inclusion of positive emotions align with perceptions of benevolence and feelings of warmth, components contributing to trust (Mayer, Davis, and Schoorman, 1995). Similarly, Beckett and Deuze (2016) argue emotional authenticity increasingly determines the trustworthiness of journalism.

Despite theoretical grounds for constructive journalism increasing trust, evidence is limited and contradictory. While Thier et al. (2019) and the Solutions Journalism Network (2021) found solutions reporting can increase consumer trust, Meier (2018) found constructive articles containing "hope, prospects and proposed problem solutions" (p.769) thought marginally more likely to contain concealed advertising – potentially indicating distrust. In both cases, effect sizes were small.

The present study measured trust in the content of articles, and in journalism as an institution, to investigate the effects of constructive journalism on trust under experimental conditions. Consistent with current literature on trust in news, we predicted consumers reading constructive news articles would report greater trust in journalism as an institution (Hypothesis 4) and greater trust in the content of the articles (Hypothesis 5) than consumers reading equivalent articles without constructive features.

1.5 The present study

While constructive journalism has been suggested to produce positive outcomes, the evidence base is relatively small. Most published experiments on constructive journalism have included solutions and positive emotions, neglecting other techniques, including future orientation, inclusiveness and diversity, context, and co-creation. We extend the evidence base for constructive journalism, investigating the effects of a wider variety of constructive techniques on comprehension, trust, and mood.

We included interest as a covariate. Interest has exerted a general influence on audience responses, including on positive and negative emotion, in previous studies (Hermans and Prins, 2020; McIntyre, 2019). Effort expended reading the article was included as an exploratory covariate, as humans are cognitive misers who avoid expending mental effort where possible, and are more likely to believe, retain, and trust information that is easily processed (Koch and Forgas, 2012), and is likely to influence comprehension (Lang, 2000).

Given rising interest and implementation of constructive journalism approaches, further empirical testing is needed. Constructive journalism may be useful in alleviating the impacts of reporting on consumer mental health, comprehension, and trust. Conversely, such approaches may have unintended or null effects equally important to understand.

2. Methods

2.1 Sample

Australian participants were recruited through Prolific Academic, an online crowdsourcing platform, and reimbursed £1.80 for participating (Prolific, 2019). Participants who completed the study in less than 5 minutes were excluded as they would not have had time to read the articles. A priori power analysis suggested 200 participants with four trials each would provide sufficient

power (β = .8), to detect an effect of d = .28, or eta-squared = .012 (Faul et al., 2009). The final sample comprised 238 participants and was approximately evenly separated across gender, though younger and more educated than the general population (Australian Bureau of Statistics, 2016; Table 1).

2.2 News Articles

Articles were developed from recognised examples of constructive journalism by the constructive journalism network, or outlets (for example, *Fixes* in *The New York Times*). Thirteen pre-existing articles were selected and edited to reduce the length and produce a Control and Constructive condition, guided by Hermans and Gyldensted's (2019) elements of constructive journalism, including: solutions, future orientation, empowerment, inclusiveness and diversity, context/The Rosling, and co-creation. Control versions were generated using the same articles but removing constructive elements. Articles in both conditions were approximately equal in length, and kept consistent in other features, including images, emphasised quotes, and number of headings.

The articles were independently reviewed by two constructive journalism experts (the fourth and fifth authors) and two lay reviewers who blindly sorted the articles into constructive and non-constructive categories as a manipulation check — all articles were correctly classified. Throughout this process, the articles considered the best examples of constructive journalism and as having the best balance between control and constructive versions were selected in consultation with all reviewers. The final set of stimuli consisted of five articles, each with a Constructive and Control version. Article topics included: Foster youth in the United States (Huffpost); conservation of Boreal forests (Huffpost); alternative jet fuels (Reset); children in Israel and Palestine (The New

York Times); and cities in Uganda (The Guardian). Five of the six constructive journalism techniques were present in the Constructive condition, with co-creation not in the available articles.

The manipulation was further checked using sentiment analysis with the tidytext package in R; constructive articles had higher positive valence (Silge and Robinson, 2016); and a Flesh-Kinkaid readability test to ensure equivalent levels of complexity across conditions (Web FX, na). Stimuli, changes, checks, and links to original articles are available at https://osf.io/8gt4u/.

2.3 Measures

Trust

Trust in the information was measured with a single item after each article: "To what extent do you trust the information in this article" from 0 = *Don't trust at all* to 10 = *Trust completely.*

Trust in journalism was measured with Strömbäck et al.'s (2020) scale, using the question stem "Generally speaking, to what extent do you agree or disagree with the following statements about the news media:" followed by five statements such as "the news media are fair when covering the news" on a 7-point Likert scale from 1=*strongly disagree* to 7 = *strongly agree.* Cronbach's alpha was acceptable (α = .90).

Mood

Mood was measured with a single item after each article: "How did the information in this article make you feel?" on a scale from 0 = *very negative* to 10 = *very positive.* This measure was a covariate in the linear mixed-effects model.

Positive and negative emotion as outcome variables were measured using the I-PANAS-SF (Thompson, 2007). Following all articles, participants were asked "Thinking about yourself and how you feel right now, to what extent do you feel:" followed by ten emotions (five positive

and five negative) responded to on a five-point scale from 1 = *not at all* to 5 = *a lot*. Cronbach's alpha for both scales was acceptable (α = .79).

Comprehension

Comprehension was measured using six recognition and recall questions. Participants were asked "Please select as many of the 5 stories you saw here today as you can remember." and provided with a list of 11 stories. Participants then responded to a multiple-choice question for each article on facts consistent across conditions. A score of one was given for each correct response; forming a comprehension measure from 0 to 10.

Interest

Interest was measured after each article with the item "How interested are you in the topic you just read?" from 0 = *Not at all interested* to 10 = *Very interested.*

Effort

Effort was measured after each article with the item "How much effort did it take to read this article?" from 0 = *No/very little effort* to 10 = *A lot of effort*.

News use and interest

Items measuring Participants' use and interest in news were adapted from the Reuters Digital News Report (Newman et al., 2021). Use: "Typically, how often do you access news? By news we mean national, international, regional/local news and other topical events accessed via any platform (radio, TV, newspaper, podcast, or online including social media)." 0 = *Never* to 9 = *More than 10 times a day*.

Interest: "How interested, if at all, would you say you are in news?" 1 = *Not at all interested* to 5 = *Extremely interested.*

2.4 Procedure

The study used a randomised controlled repeated-measures experimental design. Participants were randomly allocated to either the Constructive or Control condition in which they read five articles with (Constructive) or without (Control) constructive features. After each article participants responded to four single-item questions related to their trust in the article's contents, their mood in response to the article, the effort they felt was required to read the article, and their interest in the article. After reading all articles, participants completed the PANAS scale, the trust in journalism scale, and the items pertaining to news use and interest. Participants then answered the comprehension questions and ended with demographic questions. Prior to running the experiment, a pilot study was conducted to check timing and usability of the study interface.

2.5 Data analysis

Data was cleaned and analysed using R version 4.04 (R Core Team, 2019). Data were visualised and investigated for non-normality. Differences between conditions on outcome variables were tested using exact permutation tests with the coin package (Hothorn et al., 2006). Exact permutation tests allow compare the test statistic to a distribution produced by resampling the data without replacement for all possible permutations of the data. Such tests do not rely on assumptions about the data distribution and provide exact p-values based on the sample, rather than a theoretical distribution.

As effect sizes for trust measures are often small (e.g., Thier et al., 2019), a linear mixed-effects model was run using the single-item measures after each article to investigate the effect of constructive journalism on trust with greater power, whilst including covariates. The linear mixed-effects model included participants and articles as random effects to account for non-independence and variation due to stimuli and individual differences. The covariates mood, interest, news use,

and news interest were entered as fixed effects, as was condition (Control/Constructive). Interest

and mood were entered as moderators of the condition. The fully specified model is below:

$$trust \sim mood + interest + newsuse + newsinterest + condition + mood * condition$$
$$+ interest * condition + (1|participant) + (1|article)$$

The model was estimated using the lme4 package in R (Bates et al., 2015). All numerical

variables were scaled prior to estimation for ease of interpretation. Model assumptions were

checked using the DHARMa package (Hartig, 2021). P-values were estimated using

Satterthwaite's method to estimate degrees of freedom and significance. Models, checks, and data

are available at https://osf.io/8gt4u/.

3. Results

The randomisation appeared successful, as differences in gender, education, age, news use, and news interest were non-significant between conditions, see Table 1.

Table 1

Participant characteristics (N=238)

Variable	*N (Constructive)*	*N (Control)*	% sample
Gender			
Male	61	56	51.3
Female	57	61	47.5
Non-binary/Prefer not to say	1	2	1.3
Age			
18-24	28	26	22.7
25-34	47	51	41.2
35-44	23	21	18.5
45-54	11	12	9.7
55-64	7	7	5.9
65-74	2	2	1.7
75-84	1	0	0.4
Education			
Did not complete high school	5	4	3.8
Year 12	12	19	13.0
TAFE certificate or diploma	10	5	6.3
Some university but no degree	9	6	7.6
Undergraduate	11	7	40.8
Post-graduate diploma	46	51	6.3
Masters	17	18	14.7
Doctorate	9	9	7.6
	M (SD)	M (SD)	Range
News use	6.23 (1.64)	5.98 (1.78)	0-9
News interest	3.39 (0.82)	3.33 (0.91)	1-5

3.1 Effect of constructive news on emotion

Consistent with hypothesis one, positive emotion was significantly higher among participants in the Constructive than the Control condition, with a moderate effect size ($Z = 3.94$, $p < .001$, $d = .53$), see Figure 1.

Figure 1. Positive emotion scores in Control and Constructive conditions, including means (bold), standard deviations (italics), and standard error bars. News use and news interest included as size and transparency respectively.

Consistent with hypothesis two, negative emotion was significantly lower among participants in the Constructive condition comparative to the Control, with a small-moderate effect size ($Z = -2.68$, $p = .007$, $d = .35$), see Figure 2.
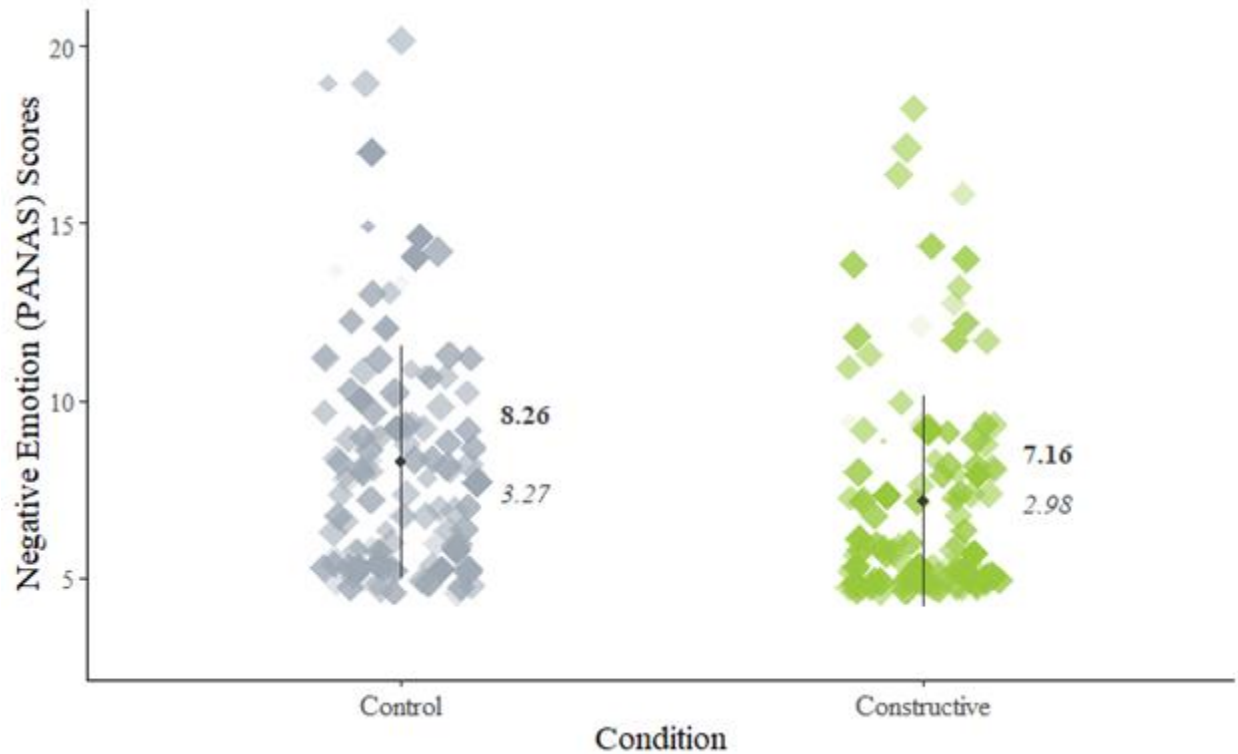
Figure 2. Negative emotion scores in Control and Constructive conditions, including means (bold), standard deviations (italics), and standard error bars. News use and news interest included as size and transparency respectively.

3.2 Effect of constructive news on comprehension

Consistent with hypothesis three, differences in comprehension across conditions were significant. Comprehension was higher in the Control than the Constructive condition. The effect size was again small-moderate ($Z = -3.14$, $p = .002$, $d = .42$), see Figure 3.
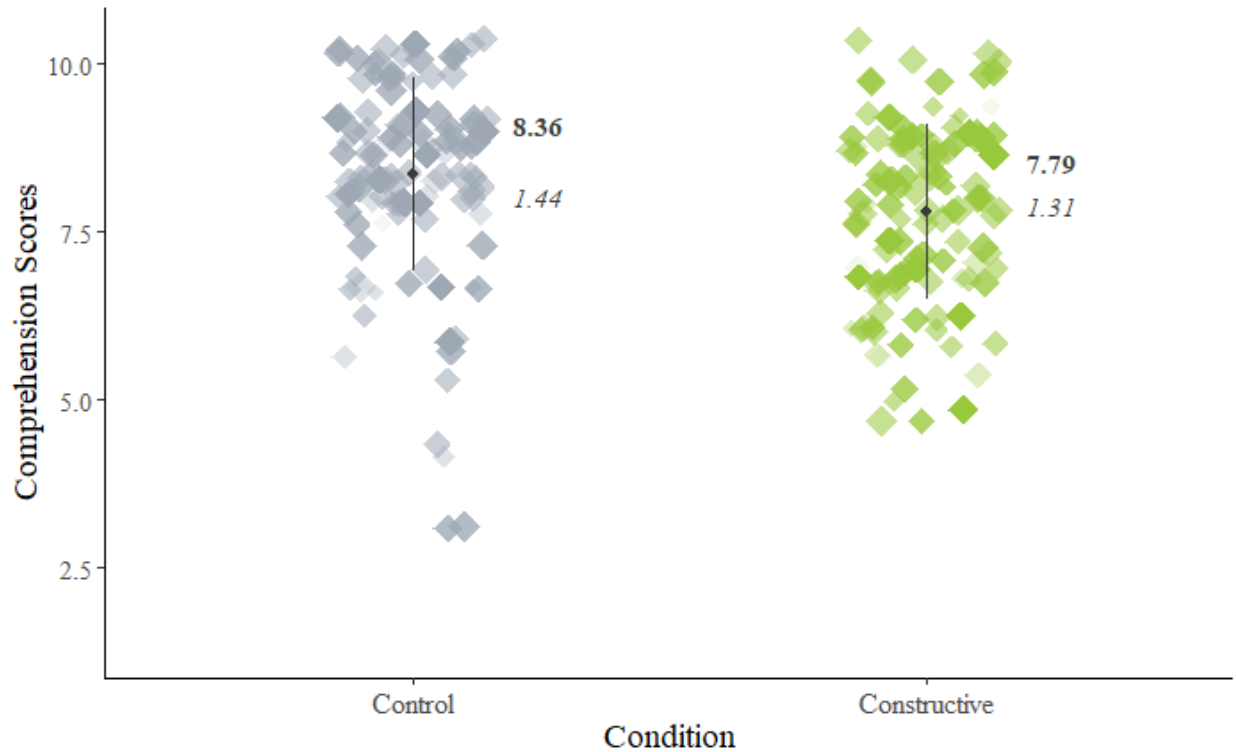
Figure 3. Comprehension scores in Control and Constructive conditions, including means (bold), standard deviations (italics), and standard error bars. News use and news interest are included as size and transparency respectively.

Following recommendations by Kleemans et al. (2018), and predictions by the Limited Capacity Model (Lang, 2000), the effect of constructive journalism on comprehension was tested with negative emotion as a mediator. Consistent with hypothesis 3A, the effect was significant (b = .07, p = .032, 95% CI [0.004, 0.17]), but small, accounting for only 11.7% of the variance explained by condition, suggesting it was not the sole explanation for differences in comprehension. Effort was also tested as a mediator, with no significant effect (b = -.01, p = .56, 95%CI [-0.06, 0.02]), inconsistent with hypothesis 3B and suggesting effort did not explain significant difference in comprehension across conditions.

3.3 Effect of constructive news on trust in journalism

Inconsistent with hypothesis four, differences in trust in journalism were non-significant, indicating no effect of the Constructive condition on participant's trust in journalism as an institution relative to the Control ($Z = -.50$, $p = .624$, $d = .07$), see Figure 4.
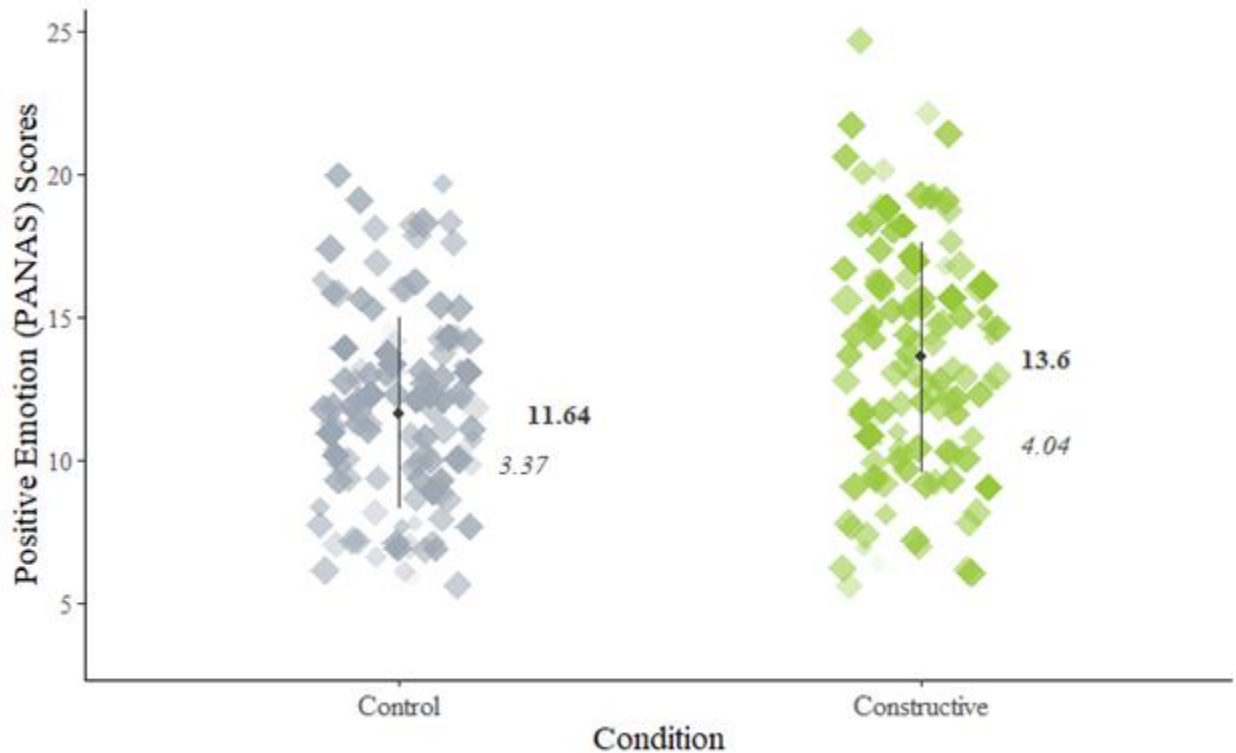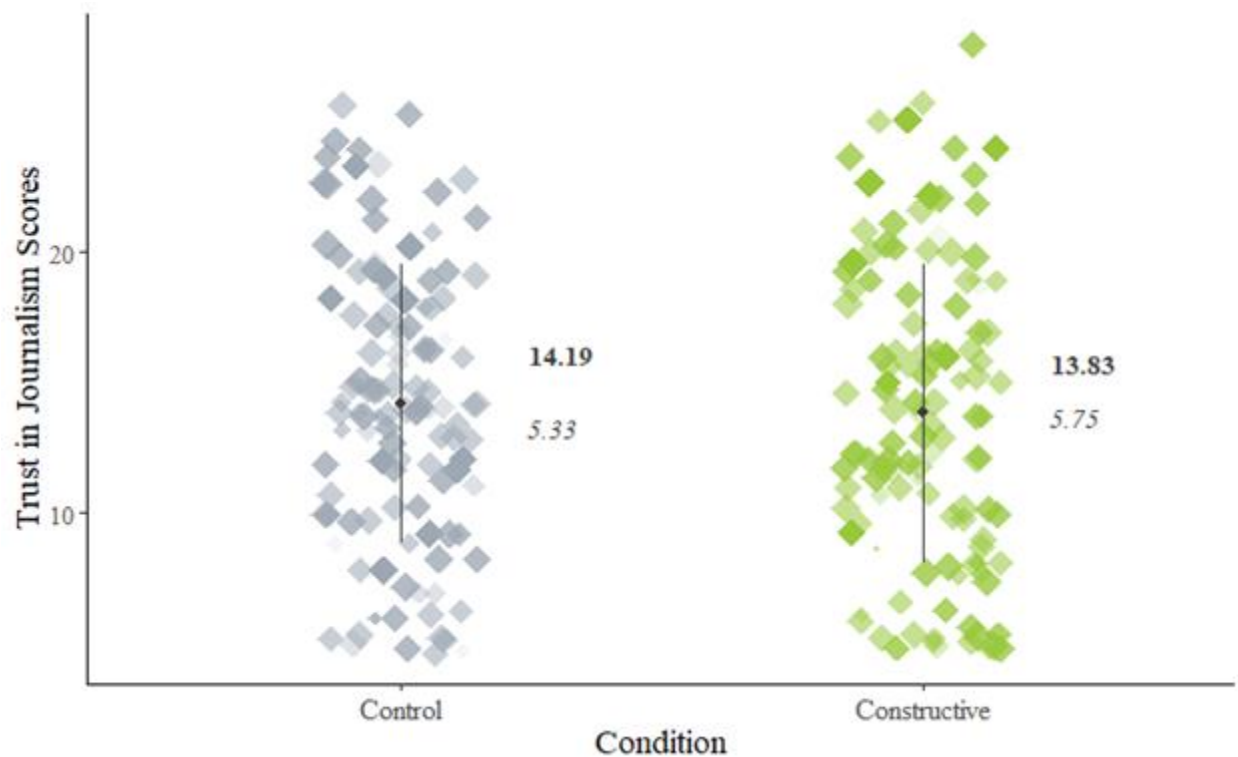

Figure 4. Plot of trust in journalism scores in Control and Constructive conditions, including means (bold), standard deviations (italics), and standard error bars. News use and news interest are included as size and transparency respectively.

3.4 Effect of constructive news on trust in the information

Compared to a null model containing only the intercept and random effects, the linear mixed-effects model investigating predictors of trust in the information was significant ($\chi^2(7) = 1712$, $p < .001$, AIC = 2736.6). Interest had a significant positive effect on trust (Table 2). The results provide mixed evidence concerning hypothesis five; condition (Constructive/Control) was not a significant predictor where no covariates were present (condition only), however, once

4

accounting for interest, the Constructive condition had a negative effect on trust, except where moderated by mood, under which conditions it had a positive effect on trust. For plots on interest, mood, and trust data please see https://osf.io/8gt4u/.

Table 2

Estimates for fixed effects of linear mixed-effects model predicting trust in the information

Variable	Estimate	Standard Error	t	df	p-value	95% CI
Intercept	.05	.08	0.59	26.73	.56	[-.11, .21]
Mood	.02	.04	0.35	976.96	.72	[-.07, .10]
Interest***	.35	.04	9.88	1172.73	<.001	[.28, .42]
News Use	.04	.05	0.80	232.00	.42	[-.06, .15]
News Interest	-.35	.04	-0.22	238.80	.83	[-.12, .09]
Condition (Constructive)*	-.23	.10	-2.36	297.55	.02	[-.41, -.04]
Mood:Condition (Constructive)***	.24	.06	4.23	1172.73	<.001	[.13, .35]
Interest:Condition (Constructive)	-.09	.05	-1.69	1159.32	.09	[-.19, .01]

4. Discussion

The present study investigated the effects of constructive journalism on consumer mood, comprehension, and trust using a randomised controlled repeated-measures experiment. Participants were randomly assigned to read articles adapted from recognised constructive journalism pieces containing constructive journalism techniques (Constructive) or the same articles without constructive elements (Control). They rated their interest and trust in the articles, how the articles made them feel (their mood), and the level of effort required to read the articles before completing measures of mood, comprehension, and trust in journalism.

Our findings show constructive journalism can have mixed effects – while our manipulation increased positive emotion and decreased negative emotion, we found a decrease in comprehension, and a null effect on trust. Moreover, when accounting for self-reported interest in

the articles there was a negative effect of constructive stories on trust in the information, though constructive stories had a positive effect on trust where they improved mood.

Our finding that participants in the Constructive reported higher positive and lower negative mood relative to those in the Control condition is consistent with and extends previous findings in constructive journalism by investigating a wider range of techniques and topics (see for example Baden et al., 2019; Hypotheses 1 and 2). Given concerns of news media's impact on mental health, including throughout COVID-19, such findings contribute to suggestions constructive journalism can reduce this impact (Baden et al., 2019; Boukes and Vliegenthart, 2017). Similarly, given the main reason for news avoidance is negative mood, such findings warrant investigation into whether constructive journalism reduces news avoidance; currently evidence suggests constructive reporting to increase engagement, though findings vary (Baden et al., 2019; Hermans and Prins, 2020; McIntyre, 2019; Skovsgaard and Andersen, 2020).

Participants scored higher on the comprehension measure in the Control condition, indicating constructive journalism to have a negative effect on comprehension, consistent with Kleemans et al. (2018; Hypothesis 3). While seemingly contrary to claims of constructive journalism providing a more accurate worldview, our comprehension measure consisted of recognition questions aligning with facts in both Constructive and Control articles and concerning discrete pieces of information. The Limited Capacity Model suggests negative emotion increases attention and retention of detailed information – though stronger for recall than recognition (the latter measured in this study). Accordingly, we tested negative emotion - higher in the Control than Constructive–condition - as a mediator the constructive journalism manipulation's effect on comprehension (Lang, 2000). While negative emotion mediated the relationship between constructive journalism and comprehension, it accounted for a small portion of variance,

suggesting negative emotion influenced retention, but was not the sole or main explanation for the negative effect of constructive reporting on comprehension. Further, we found no effect of effort as a mediator, suggesting differences in comprehension were not explained by perceived effort across conditions.

While notable that constructive journalism may reduce retention of information in memory, recall of specific figures and information does not capture overall judgements and perceptions. Constructive journalism is suggested to improve overall perceptions of developments and context around events, potentially better captured by open-ended and more interpretive questions, or those employed by GapMinder to measure general misperceptions about developments (Gapminder, 2021). Given Kleemans et al. (2018) found children to exhibit worse recall for basic information, but better recall of broad information, about a reported event in Constructive comparative to Control conditions, future research may investigate how and to what extent comprehension varies across different domains in response to constructive journalism. As a key role of journalism is to inform, understanding why and under what conditions constructive journalism contributes to increases or decreases in comprehension posits an important area of investigation. Understanding the mechanisms behind differences in comprehension would help tailor constructive journalism techniques to specific reporting purposes and educate journalists to use them in a manner that minimises negative and maximises positive impacts.

Hypothesis 4, that constructive reporting would increase trust in journalism, was not–supported - no significant differences were observed between conditions on the trust in journalism scale. While this result runs contrary to suggestions by advocates of constructive journalism, trust in journalism as an institution may be a relatively stable concept, unlikely to be moved with a small set of articles and short timeframe. Accordingly, longitudinal research may be better suited to

measure broader level changes in trust. Additionally, the lack of effect on trust in journalism may be due to the target of trust measured. As previous work has found audiences of solutions journalism to report higher than average trust in outlets, constructive approaches may increase trust in particular brands, without increasing trust in journalism overall (Thier et al., 2019). Comparison of trust measures across various targets may be a beneficial line of future enquiry.

More surprising is the finding that participants reported less trust in the article contents in the Constructive condition once accounting for interest, though reporting higher trust in the Constructive condition where articles also increased mood. There are a few takeaways. Firstly, no significant differences between conditions existed before accounting for other variables, suggesting constructive reporting techniques do not decrease trust in the information provided they increase mood and interest. In the present study, mood was significantly higher in the Constructive than the Control condition. Nevertheless, that participants reported less trust once accounting for interest bears examination. While our present data is insufficient for further empirical investigation, we venture some potential explanations below for future examination.

As previously, differences may be due to the target of trust measured; the article content. As previous research has found participants more suspicious of hidden advertising in Constructive conditions (Meier, 2018), participants may have been more sceptical of hidden motives in the constructive stories. This possibility could be explored by asking about perceived motives or possible advertising in future studies, and/or including open-ended or interview questions to gain a qualitative understanding of participants' reasons for (dis)trusting articles. Qualitative research would be beneficial regardless in providing a more in-depth understanding of what leads to (dis)trust in experimental stimuli, rather than being limited by pre-conceived explanations. Previous researchers have also suggested constructive journalism may appear less credible due to

the predominance and thus familiarity of negative news, increasing scepticism toward less familiar constructive reporting (Rusch et al., 2021).

Another potential explanation is that participants are generally sceptical of news and therefore reluctant to report complete trust in the information - scores on the trust in journalism scale averaged approximately 40%, and maximised at 80%, of the total possible score across the sample – reflective of an attitude of generalised scepticism reported in previous studies (Nielsen and Graves, 2017), and potentially leading to a flattening of scores across conditions. Additionally, while changes such as more in-depth reporting, as advocated by constructive journalism, were suggested to be valued by Australian audiences to increase trust, this was among those already predisposed to trust the news (Fisher et al., 2020). Those already low in trust may be less responsive to such changes. Future research could explore these explanations by inclusion of qualitative evaluation, through within-subjects designs - reducing the effect of individual differences in propensity to trust across conditions - and through partitioning participants into high and low trusting groups using a pre-stimuli measure.

Given the modest relationship between trust and news use (Strömbäck et al., 2020), and the main reasons for declining use of news include it being "repetitive, confusing, and even depressing" (Newman et al., 2021, p.12), the impact of constructive news on emotions may be more important for encouraging citizens' use of news than changes in trust. In previous studies participants have reported a preference for solutions or constructive stories, suggesting the approach may increase engagement (Baden et al., 2019; Hermans and Gyldensted, 2019; Hermans and Prins, 2020). Additionally, the extent to which trust in news is a desirable outcome has been questioned, with suggestion a better outcome would be encouragement of healthy scepticism in place of unhelpful cynicism (Citrin and Stoker, 2018; Fisher, 2016).

Irrespective of such debates, the effect of constructive journalism on trust bears further examination, including investigating the extent to which various techniques increase or decrease trust, and in which domains. Additionally, the relationships between trust, mood, interest, and engagement would benefit from further study. Theoretically, constructive journalism appears promising for increasing trust, and solutions journalism has indicated some capacity for doing so (Thier et al., 2019), however, if constructive journalism is also producing negative effects on trust, it is important to understand how and why this occurs, and the ramifications for practitioners and outlets employing the approach.

4.1 Limitations and future research

This study contributes to the literature by presenting the results of a randomised controlled repeated-measures experiment including a broader range of constructive journalism techniques. However, it has limitations. As noted in the methods section, co-creation was not present in the articles used. While the stimuli set builds on previous studies of constructive journalism by including a broader range of techniques, investigation of co-creation in future research would be beneficial – particularly as a more relational approach may increase trust (Zand, 2016).

Secondly, while many studies of constructive journalism have used stimuli with minor changes, such as a sentence or paragraph presenting a solution, between Constructive and Control conditions, the present study aimed to produce stimuli with higher fidelity and ecological validity. The articles in both conditions shared the same initial material, underwent a systematic process to produce the stimuli, and were checked by expert and lay reviewers. Nevertheless, articles were subject to greater variation between conditions, which may have reduced a degree of internal validity, though increasing external validity.

Thirdly, as previously discussed, some limitations in measures may have influenced the results. These limitations primarily pertain to measures of trust and comprehension. Comprehension was focused upon recognition of facts and details consistent across both conditions. While this provides a useful insight into the impact of constructive and non-constructive reporting approaches on recognition, it is a poor proxy for arguably more important aspects of comprehension – such as a story's purpose or main point. Future research could employ broader measures of comprehension to investigate whether constructive approaches have a varying influence across different domains of comprehension.

Regarding trust, as previously discussed, effects may be influenced by the object of trust examined – in this case, information, and journalism as an institution. Particularly given constructive journalism has been found to increase mood, the approach may result in greater trust in the author or outlet, being perceived as more beneficent. Future research should therefore include measures of trust in the author/outlet. Inclusion of qualitative as well as quantitative methods would also be beneficial in understanding participants' reasons for (dis)trust. In addition, longitudinal research would be better equipped to investigate the effects of constructive journalism on trust, particularly trust in outlets and journalism as an institution, as these are unlikely to be strongly moved in the duration of an experiment.

While previous work on constructive journalism has primarily been conducted with European or United States participants, the present study recruited Australian participants. As media norms differ within countries and regions, the results may be influenced by the nationality of the sample. It is worth investigating whether responses to constructive journalism, particularly ones such as trust which may be more context-dependent, vary across different nationalities as well as demographics.

As an important role of the news is to convey information, and such a role relies to some extent on trust from the audience, the effects found in this study merit further investigation to better understand the consequences – both negative and positive – in the use of constructive approaches to reporting.

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Chapter Seven: Discussion

I investigated news media in relation to the spread and belief of misinformation. In particular, I explored the use of constructive journalism as an intervention with the potential to reduce some of the negative (and increase some of the positive) consequences of news reporting. The thesis trajectory, and the more specific questions addressed within each chapter were informed by a systems thinking approach to conceptualising misinformation and its spread, conducted through the lens of critical realism. Both systems thinking and critical realism advocate a critical methodological pluralism, particularly where the phenomena investigated is complex and interdisciplinary in nature. Accordingly, as misinformation is a complex problem requiring an interdisciplinary response, I used a range of methods. I will overview and consolidate these studies, their methods, and contributions, before discussing the limitations of the research, suggestions for future research, and practical recommendations. As previously, Figure 14 depicts a summary of the chapter's content.
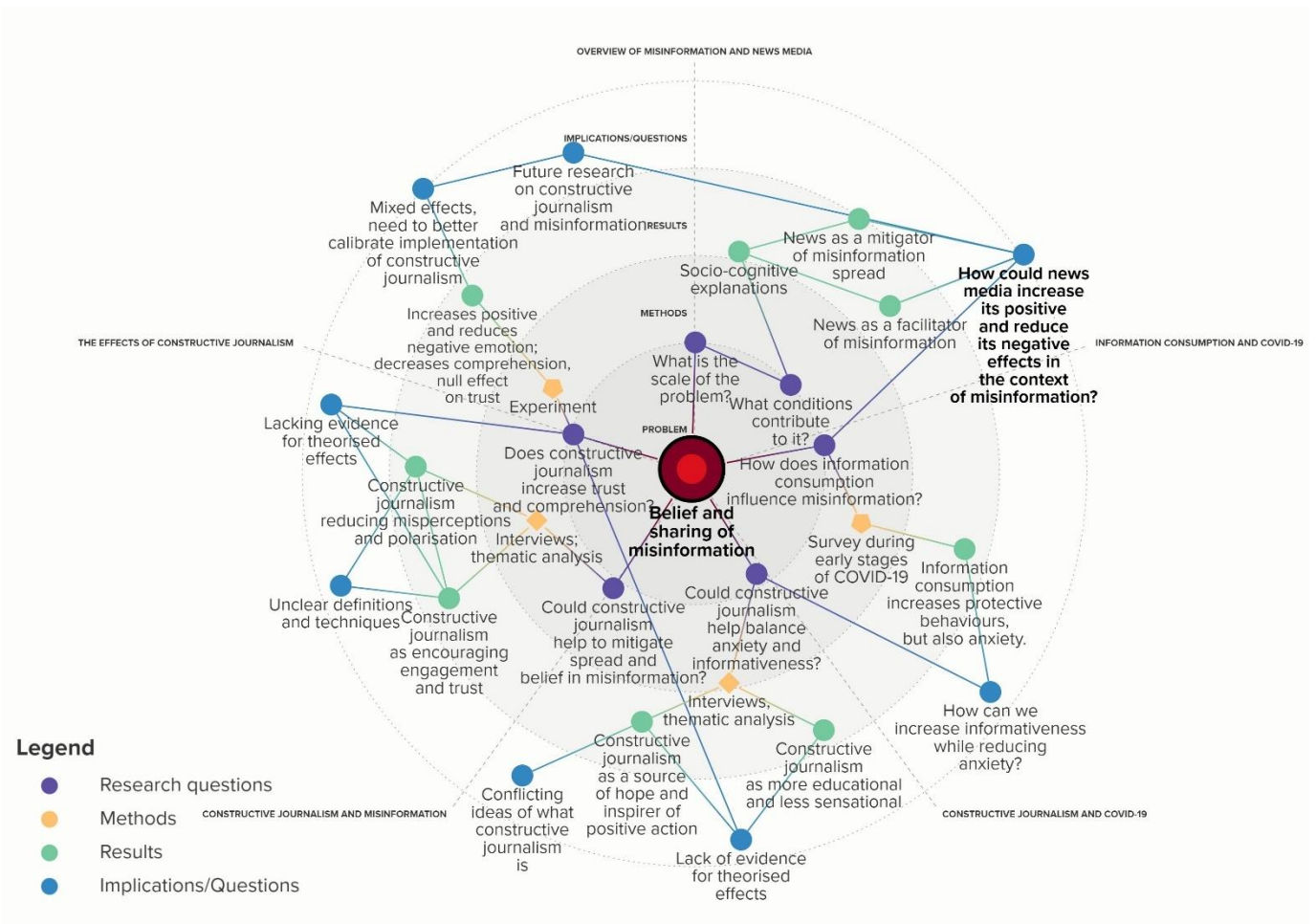
Figure 14. Visual table of contents for the thesis.

7.1 Overview of the studies and contributions

The first study was a survey focused on COVID-19, examining the impact of information consumption on anxiety, risk perception, belief in misinformation, and protective behaviours in the early stages of the pandemic. Given the focus on the infodemic at the time of the study, information consumption was conceptualised as both the volume and frequency of information sources. The primary contribution of this piece was to note that information consumption was positively related to anxiety, which was somewhat functional in terms of increasing protective behaviours. However, I also suggested a need to investigate alternative ways of reporting which

increased the path from information consumption to protective behaviours without inciting undue anxiety. Within the paper, constructive journalism was recommended as one such way of reporting, which looked to balance the impact of news on anxiety with its benefits on informativeness. The paper also contributed to a body of evidence finding relationships between belief in COVID-19 misinformation and reduced protective behaviours, though this was not replicated in our Australian sample.

In the second study I investigated constructive journalism as a potential response to both misinformation spread and the negative impact of COVID-19 related news on the mental health and wellbeing of consumers. I conducted a series of interviews with professionals in journalism interested in the approach. In the context of COVID-19, the journalists in my sample viewed themselves as navigating multiple roles throughout the pandemic, the main role being to educate the public. These interviews shed light on how constructive journalism might be a useful approach to news reports in the pandemic, and where further research would be beneficial for probing the efficacy of constructive techniques in practice.

Similarly, the third study included an analysis of the application of constructive journalism to reducing the spread of and belief in misinformation from the perspective of journalism professionals. This paper suggests future directions for research on constructive journalism as an intervention to address problems concerning misinformation and news media, drawing on insights from journalism professionals. I discuss the potential for constructive journalism to reduce polarisation, increase engagement and informativeness, and decrease misperceptions. All of these pose areas for further research and would likely benefit from integration with existing psychological literature on misinformation. Such integration could include the role of context in constructive journalism and in mitigating the continued influence effect when correcting

misinformation. Similarly, linking constructive journalism and its intended reduction of widespread misperceptions with Bayesian belief updating (see Chapter 1.3.2) could be a promising route to understanding the mechanisms by which constructive journalism could contribute to a reduction in misinformation belief and spread.

The final study was a randomised controlled experiment investigating the effects of a constructive journalism manipulation on participants' emotions, comprehension, and trust. The piece contributed to the evidence base for constructive journalism by testing some of these claims which remained under-examined in constructive journalism, and doing so using a broader range of techniques than previous studies. The study also drew on a sample from Australia, a country relatively un-studied in constructive journalism (Lough & McIntyre, 2021). Consistent with previous studies, constructive reporting techniques were found to increase positive and reduce negative emotions relative to more prototypical news reporting. However, participants in the Constructive condition performed worse on a comprehension task. Participants also reported no significant differences in trust in news as an institution, or in the information presented, until accounting for interest and mood; at which point they reported decreased trust relative to participants in the Control. These results suggest a need for further research on the best calibration of constructive journalism techniques, to increase their positive effects on mood without incurring undue negative effects on trust and comprehension.

Overall, my work proposes constructive journalism as a promising intervention which mitigates some of the negative and increases some of the positive consequences of news reporting in the context of misinformation and begins testing relevant claims regarding its effects. The broad suggestions for developing constructive journalism stemming from my analyses extend on those of Lough and McIntyre's (2021) systematic reviewing of the field. Namely, that there is a need for

(i) more conceptual clarity about what is and what is not considered 'constructive' journalism, (ii) greater understanding of how constructive journalism is implemented across various contexts, particularly national contexts, (iii) further development of theory underlying the approach, and (iv) further empirical testing of the effects of constructive journalism. I extend on these suggestions by evaluating how journalism professionals view and use constructive journalism approaches across an international sample of participants, to understand the current working definitions and implementations being used in the field. I further contribute to these suggestions by investigating constructive journalism in the context of COVID-19 and misinformation and suggesting specific uses of the approach within these contexts, both in practice and empirical testing.

Practically, my results add to suggestions that training in constructive journalism would benefit from clearer guidelines for journalists in terms of what constructive journalism constitutes. Greater clarity is needed on the degree to which the journalist is seen as an active shaper of news reports compared to a more traditional passive reporter. Similarly, clearer guidelines are needed on how to go about using constructive techniques when reporting. While, as stated in the articles, progress has been made on establishing techniques in constructive journalism (see Hermans and Gyldensted, 2019), these guidelines are not universally used. Further training for journalists on how to practically include constructive elements such as context and solutions, as well as tools to enable techniques such as co-creation, would help in implementing the approach. Attention should also be given to the adaption of constructive journalism to the context and format of reporting, particularly across contexts such as developing countries or those with high levels of oppression and corruption where constructive journalism might be perceived poorly by the public or seen as a form of propaganda.

In addition to suggestions that constructive journalism may assist in optimising the consequences of news media, particularly in the context of misinformation and COVID-19, I also contribute to the evidence base for constructive journalism. However, as previously iterated, the final study found constructive journalism techniques to have null or negative effects on trust and comprehension, suggesting the need for further investigation and tailoring of constructive journalism techniques to reduce their potential negative effects on comprehension and trust. The findings of the studies, as reviewed above, therefore open up further questions and avenues for research, including:

1. Ways information producers, such as news media, can increase or maintain their potential positive effects (e.g., informativeness, greater protective behaviours during COVID-19)[29] while reducing their potential negative effects (e.g., anxiety, negative emotion, polarisation).

2. Theoretical and practical development of constructive journalism to form a cohesive approach which journalists can readily apply to the reporting of news stories across an array of formats, contexts, and topics.

3. Empirical testing of the effects of constructive journalism, including testing of a wider range of constructive journalism techniques, the impacts of sustained constructive journalism consumption, and outcomes such as trust, comprehension, engagement, misperceptions, and polarisation.

4. How to further integrate existing interventions to address misinformation with changes to institutions such as news media. In particular, how to test constructive journalism as an intervention in the context of misinformation, and its relation with existing responses.

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[29] Taking a broad view of news media, as the effects of some outlets may differ.

Some suggestions for each of these, and practical recommendations building on the results, will be expanded on below. However, firstly I will overview some constraints on the studies.

7.2 Constraints on generalisability and interpretation of results

The first study included cross-sectional data on information consumption and anxiety, belief in misinformation, risk perception, and protective behaviours throughout the COVID-19 pandemic, and therefore cannot be used to draw causal inferences about relationship between information consumption and responses to COVID-19. Nevertheless, these data do show how participants use of information sources throughout COVID-19 was related to their emotional and behavioural responses in a naturalistic setting, which would not be possible with different methodology. The first study was also reliant on self-report data, which, while appropriate for questions on emotions, beliefs, and evaluations, may differ from actual behaviours (Baumeister, Vohs, & Funder, 2007). Additionally, while this study contributed to understanding of the impact of the "infodemic", a predominant concern at the time of the study, responses may have been different had they been analysed at a granular level (i.e., by individual sources). Future research could look to do so, provided access to a dataset with a sample size sufficient to analyse the relationships between individual media sources and participant responses.

The interview studies contribute to the conceptual development of constructive journalism and its use and benefits in the context of both COVID-19 and misinformation; however, they do not provide evidence of the actual efficacy of constructive journalism in these contexts, nor are they intended to. Questions about the efficacy of constructive journalism interventions call for experimental research designs similar to the one adopted in the final study. Additionally, as noted in Chapters Four and Five, the results of qualitative analyses, while they can be generated rigorously and methodically, are still likely to vary from researcher to researcher (indeed the same

can be true of quantitative analyses also; e.g., Gelman and Loken, 2013). While the analyses of these interviews give insight into the role and contribution of constructive journalism as seen by professionals in the field, the points of focus and emphasis may have differed had another researcher conducted the analysis, particularly had they been from a journalism, rather than a psychology, background.

While the final experimental study does provide evidence of the effects of constructive journalism, it too is subject to constraints on how the results can extrapolated, many of which are detailed in Chapter Six. Firstly, that it only measures select aspects of comprehension and trust, which may influence the results. A previous constructive journalism experiment found participants across Constructive and Control conditions to perform differently when considering multiple aspects of comprehension, such that those in the Constructive condition performed better on recall of specific news items while those in the Control condition performed better on recall of basic information about the event reported. Differences in comprehension may therefore vary depending on its measurement/focus (Kleemans et al., 2018). Similarly, responses to different targets of trust, such as the information, the author, the outlet, or the institution, have been suggested to be influenced differently by news media interventions, and thus differences in trust may also vary according to measurement (Fisher, 2016; Strömbäck et al., 2020). Secondly, while the study considers a broader range of techniques than previous works in constructive journalism, it does not include co-creation, the creation of news reports in conjunction with audiences, and therefore does not encompass the full array of constructive journalism techniques recognised by Hermans and Gyldensted (2019). However, the study does build on previous works by including a wider array of techniques than those previously employed in constructive journalism studies. Additionally, as with previous studies of constructive journalism, longitudinal and more

ecologically robust studies would be beneficial in teasing out the effects of constructive journalism over a sustained period, particularly on outcomes such as trust which may take time to develop and thus may not be easily moved within a single experiment. Further studies, both experimental and longitudinal, would also be beneficial to understand where effects may be due to features of the stimuli (such as the story topic or layout) rather than constructive techniques. While I endeavoured to control for these variables in the study, more replications are needed to make definitive claims on the influence of constructive techniques on trust and comprehension.

The interview studies drew on a relatively global sample, including participants from European and African countries as well as North America and Australia. However, the survey study is consistent with previous research concerning misinformation, which has predominantly been focused on Western countries, particularly the United States (Badrinathan, 2021). As recent works suggest variation in responses to misinformation across non-Western nations (see for example Badrinathan, 2021, on inoculation and digital literacy in India), the extent to which the effects are generalizable beyond the national contexts of their samples is therefore questionable; though there is some suggestion the United States and Australia also differ considerably on factors related to news media and misinformation (see Noam, 2016, for further detail). Additionally, I primarily focused on news media in 'Western' countries; the criticisms of the news media discussed throughout may be less applicable in other countries and nations with differing approaches to journalism. Overall, the present studies are subject to many of the limitations inherent in a burgeoning area of research; conceptual vagueness, contestable measurement, a relatively limited evidence base on which to draw conclusions, a lack of replication of findings (due to limited replications, not, at this stage, a failure to replicate), and a concentration of participants from Western countries.

Additionally, as noted in Chapters Four and Five, my not having a background in journalism does present a limitation to the interdisciplinary work, as it is likely elements of great concern and salience to journalists would be less prominent to me. Nevertheless, while such a limitation should be recognised, the results of the thematic analysis in the interview studies were cross-checked with the participants, and in the final study I collaborated with researchers in the journalism field to assist in addressing this limitation. Overall, I do not provide evidence for, nor do I seek to claim, constructive journalism as a definitive answer to the problems of misinformation spread, or even to the role of news media within the context of misinformation. However, I do propose and test some mechanisms by which constructive journalism is suggested to optimise the role of news media, particularly when considering COVID-19 and misinformation spread, and contribute to the beginning of research across the two fields.

7.3 Practical recommendations and future research

Following the findings summarised above, I suggest some practical recommendations and avenues for future research, which I have briefly parsed into those related to constructive journalism and those related to misinformation. More specific suggestions have previously been discussed in Chapters Three through Six, accordingly, the present suggestions will take a broader view of the field(s) as a whole. The first sections are concerned with suggestions for misinformation research, followed by suggestions for constructive journalism research, and concluding with a proposal for a general research framework combining the two fields.

As noted earlier in this chapter, some of the main questions and areas for further research extending from the findings include:

1. Ways information producers, such as news media, can increase or maintain their potential positive effects (e.g., informativeness, greater protective behaviours during COVID-19)[30] while reducing their potential negative effects (e.g., anxiety, negative emotion, polarisation).

2. Theoretical and practical development of constructive journalism to form a cohesive approach which journalists can readily apply to the reporting of news stories across an array of formats, contexts, and topics.

3. Empirical testing of the effects of constructive journalism, including testing of a wider range of constructive journalism techniques, the impacts of sustained constructive journalism consumption, and outcomes such as trust, comprehension, engagement, misperceptions, and polarisation.

4. How to further integrate existing interventions to address misinformation with changes to institutions such as news media. In particular, how to test constructive journalism as an intervention in the context of misinformation, and its relation with existing responses.

While constructive journalism was investigated as a response to the first, some practical and research recommendations extending from the results and the above questions are detailed below.

7.3.1 Misinformation and news media

Throughout the thesis, a focus has been on the consequences of news reporting in the context of misinformation. While increasing attention has been paid to the role of mainstream news media in belief in misinformation (see for example Boyer, 2021), there is currently a lack of research on its influence within psychological studies of misinformation. This lacuna is both

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[30] As previous, taking a broad view of news media, as the effects of some outlets may differ.

surprising and problematic, given research evaluating media consumption and sharing has found mainstream news media to be predominant among the news links shared and attended to on social media (Allen et al., 2020; Guess et al., 2019), and that news media can influence factors which play a role in misinformation belief and sharing, such as increases in polarisation (Wilson et al., 2020). I contribute to the literature by overviewing the impact of the news media in misinformation spread and belief, both positive and negative, and suggesting constructive journalism as an intervention with potential to increase the positive and reduce the negative consequences of news media in the context of misinformation.

Within the interview studies, participants expressed concerns regarding the contribution of news to misperceptions. However, as noted above, research linking news media to belief in misinformation is relatively limited, with a focus often being given to social media. Understanding the extent to and the mechanisms by which news reporting contributes to or reduces belief in and sharing of misinformation would be beneficial in directing efforts toward countering misinformation through changes to news reporting, such as those of constructive journalism. Accordingly, further research into the interactions between people's information consumption, particularly of news media, and their belief in and inclination to share misinformation, would be beneficial. Similarly, research considering the influence of information consumption on factors which might encourage belief or sharing of misinformation (e.g., increased polarisation or perception of polarisation), would assist in transferring findings from experimental studies on responses to misinformation to real-world contexts and interactions within information environments. Such studies would also provide useful understanding and context for designing, tailoring, and testing alterations to news reporting which seek to reduce belief and sharing of misinformation, such as those suggested in Chapter Five concerning constructive journalism. As

referenced in the introduction (Section 1.1.2), there is also a difficulty in disentangling misinformed from uninformed beliefs, which may be important to consider when understanding how news media contributes to or reduces misperceptions.

As in Chapter Five, journalists considered encouragement of civil debate and respect for various perspectives while maintaining standards of evidence and fact to be an important part of their role, particularly when practicing constructive journalism. Ongoing interdisciplinary collaboration between journalists and socio-cognitive psychologists could assist in educating journalists on the best methods for debunking misinformation and assist psychologists in communicating about misinformation to the broader public. Similarly, such collaboration could contribute to education on meta-cognition and key contributors to evaluating evidence, such as understanding scientific consensus, or correlation as not equalling causation; encouraging more accurate reporting and assisting audiences to update their beliefs in the face of new evidence, and to better calibrate the extent to which evidence is trustworthy. Such education may also help to foster more civil and productive debate, by encouraging discussion and openness to alternative viewpoints, rather than viewing opponents from a position of cynicism; for example, perceiving them as irrational or impervious to evidence.

Recent experimental work has found that participants, regardless of political orientation, are more likely to change their beliefs when hearing of scientific consensus on a topic after being educated on what scientific consensus is (van Stekelenburg, Schaap, Veling, & Buijzen, 2021b). While this was not the case for climate change in the study cited, other experimental studies have found consensus messaging effective in the context of climate change regardless of political orientation (van der Linden, Leiserowitz, & Maibach, 2018). Given the effectiveness of such strategies, further inclusion of contextual content, such as rates of scientific consensus, within

news reporting, as recommended in constructive journalism, may be beneficial in reducing misperceptions and differences in prior beliefs. Current evidence suggests such content is relatively scarce in news reporting (Merkley, 2020), despite general improvements in the news media across other aspects of climate change reporting[31] (McAllister et al., 2021). Such reduction of polarisation and inclusion of context also align with the goals of constructive journalism expressed in the literature (see for example Hermans and Gyldensted, 2019), and discussed by participants in our interview studies. However, these proposed benefits of constructive journalism require further testing to understand if and how constructive reporting techniques can contribute to better informed and less polarised audiences and discussions.

7.3.2 Misinformation and emotion

A consistent finding in constructive journalism research, and one replicated in Chapter Six, has been the influence of constructive reporting on emotion; namely, increasing positive and reducing negative emotion. Participants in our interview study described the importance of moving away from news which unduly emphasized or encouraged negative emotions, particularly as these could become overwhelming for audiences. They suggested a greater or more balanced focus on positive stories and emotions to encourage greater engagement with information and news media, and thus greater informativeness. I tested the effects of an array of constructive journalism techniques and found them to increase positive and reduce negative emotions comparative to a prototypical news story, however, understanding the extent to which the effects of constructive journalism on emotion impact on responses to (mis)information would benefit from further research.

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[31] Though this improvement was not consistent across all outlets examined.

Interventions addressing disengagement and emotion could assist in combatting misinformation and reducing the extent to which people are uninformed. Similarly, interventions addressing the influence of emotion on sharing and information discernment could assist in reducing the extent to which audiences are motivated to share or react to negative or sensationalist (mis)information. While further research is needed to provide more tailored guidance, a possible suggestion would be prompts, akin to accuracy prompts, warning against the possibility of 'moral outrage' on digital platforms, and the influence of emotion on sharing and commenting behaviour (Rathje, Van Bavel, & van der Linden, 2021). Changes to incentive structures could also look to address some aspects of emotion's influence, reducing the extent to which outrage is encouraged by algorithms. Similarly, as arousing news reporting can increase motivated reasoning, greater attention from journalists to the emotions evoked by news reporting could help to reduce the extent to which audiences are motivated to reason in favour of their pre-existing views (Boyer, 2021). Such changes may also address concerns regarding constructive journalism by editors and news organisations, by reducing the extent to which audiences are motivated to share negative or sensationalist content in place of more positive or contextual stories.

7.3.3 Misinformation and mixed methods research

I used both quantitative and qualitative methods to gain insight into a complex problem, that of news media and its influence in the belief and sharing of misinformation, and constructive journalism as a potential response to the negative consequences of news media. While the misinformation field already consists of studies from a wide range of methodological approaches, qualitative methods currently appear underrepresented in key misinformation works, and may be of benefit. Such analyses include those suggested by Van Bavel et al. (2021), involving accessing and analysing the content on social media and online information platforms. However, qualitative

research which investigates how and why people believe and share misinformation, their motivations for doing so, and the perceived effectiveness of misinformation interventions, would be beneficial. Such studies should not replace experimental and other quantitative means of assessing such factors and processes, but rather supplement and enrich them. A combination of various approaches may contribute to the understanding and development of theory which may otherwise be constrained by pre-existing conceptualisations of the relevant causes, factors, and mechanisms at play in the belief and sharing of misinformation.

Qualitative studies would also be useful in evaluating responses to misinformation interventions, particularly interventions such as constructive journalism, which are proposed to impact multiple facets of misinformation belief and sharing, including ones related to audience perceptions and reception of information. Utilising qualitative studies alongside quantitative work could assist in understanding the effectiveness (or lack thereof) of interventions. Meanwhile, quantitative work would also assist in recognising where audience perceptions may conflict with their responses; for example, in the conflict between demands for less negative news, yet greater attention being given to such news (Trussler & Soroka, 2014), or between ratings of accuracy and likelihood of sharing information (Pennycook et al., 2021).

7.3.4 The second dimension of misinformation and polarisation

An ongoing tension exists between news media as an important source of information, and news media as contributing to distress, misperceptions, and the spread and belief of misinformation. Particularly within Chapter Five, tension was discussed in relation to trust in news, namely that trust in news reporting was important in encouraging audiences to use verified sources of information which could provide a shared sense of facts and reality, yet the negative consequences of the news could also lead to a (not unreasonable) decrease in trust, both of news

and of institutions. Similarly, participants noted what Egelhofer and Lecheler (2019) describe as a second dimension to misinformation; discourse which uses 'fake news' to discredit genuine reporting. Egelhofer and Lecheler (2019) suggest caution in using the term 'fake news' in research to reduce the spread of its negative influence on trust in news media, and inadvertent reinforcements of the concept of mainstream news media as deliberately false.

However, concerns about the communication of relevant research and its impact on responses to misinformation are not limited to the use of 'fake news'. A recent pre-print also draws attention to the (over)emphasis of the scale of the spread and belief of misinformation in research papers (Altay et al., 2021). As previously noted, studies on misinformation have reported surprisingly low volumes of misinformation (e.g., Guess et al., 2019), low extents to which people believe in misinformation (e.g., Pickles et al., 2020), and difficulty in recruiting, for example, a large sample of participants who are strong deniers of climate change (van Stekelenburg, Schaap, Veling, & Buijzen, 2021a). Such findings may also be due to limitations with measurement or recruitment pools, however, a better understanding of the scope of the problem may assist in focusing efforts on global challenges where they will have the greatest impact. Researchers in political, social, and cognitive psychology who specialise in misinformation, polarisation, and similar areas of research need access to and understanding of the extent of the problems which they face to more effectively combat and mitigate them (Altay et al., 2021). Overemphasis, inadvertent or otherwise, of the extent of the misinformation problem may increase perceptions among researchers and the public of misinformation as more common and problematic than current evidence would suggest. Given political motives and norms can play a role in the sharing of misinformation, such misperceptions may also contribute to motivations to share false or misleading content (Altay et al., 2021; Van Bavel et al., 2021).

Extending on the above, misperceptions of polarisation may also be influential in the spread of misinformation, and may be inadvertently perpetuated by both researchers and news outlets. Survey and experimental research has increasingly suggested that polarisation is overstated online and misperceived in its intensity; such that participants tend to perceive political opponents views and emotions as more extreme and divisive than is suggested by existing evidence[32]. Such misperception is often attributed to elites, partisan media, and social media, the latter of which selects for more polarised and divisive content (Enders & Armaly, 2019; Levendusky & Malhotra, 2016; Wilson et al., 2020). Experimental research[33] finds such overstatement leads to a perception of increased polarisation and misconception of the democratic values of those on the opposite side of the political spectrum (Parker et al., 2021). Given suggestions belief and sharing of misinformation is in part motivated by group membership, and group membership is heightened in polarised and partisan contexts (Van Bavel et al., 2021), misperceptions of polarisation may contribute to motivations to believe and/or share misinformation and polarising content, and to perceptions of hostility from outgroups. Just as educating about consensus rates among scientists is effective in reducing prior misperceptions (van Stekelenburg et al., 2021a), so too might educating about the actual compared to the perceived extent of polarisation assist in fostering more cooperative democratic debate. Again, communications via news media may be of assistance here. Similarly, a reduction in the extent to which news media is incentivised to produce polarised reports would be beneficial in reducing the perception of polarisation. In the context of constructive journalism, this might include not only using depolarising techniques when reporting, but also including contextual information on polarisation in news stories.

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[32] These studies focus on the United States, and the generalisability of their findings to other nations may be limited.

[33] At the time of writing this study was under review.

7.3.5 Scepticism and cynicism

Within Chapters Five and Six, I discuss and test the potential for constructive journalism to increase trust in news media. While constructive journalism has theoretical promise for increasing trust, the claim has rarely been tested in the literature. In an experimental investigation I found no such effects; instead finding constructive journalism may decrease trust where it does not increase mood and interest. While not promising for the ability of constructive journalism to address misinformation, a useful distinction from studies of news trust is that of Cappella and Jamieson (1997), regarding healthy scepticism and unhelpful cynicism. Healthy scepticism encompasses an attitude which is not dismissive of (mis)information, but which looks to evaluate its credibility and truthfulness, without accepting it blindly. Conversely, unhelpful cynicism describes an attitude of distrust, in which (mis)information is dismissed outright without examination, often due to a negative perception of the source. Studies about misinformation have tended to presume higher scientific trust or trust in institutions to be unidimensional scales, on which higher scores are positive (see for example Plohl and Musil, 2021). However, Fisher (2016) notes that critical reading is important for consumers of news media, and thus that complete trust is not necessarily positive or desirable. Similarly, complete trust in science or institutions may not be helpful, at least; insofar as it indicates a lack of critical thinking towards their actions and outputs. The distinction between cynicism and scepticism has demonstrated some efficacy when predicting trust in news (Quiring et al., 2021). Similarly, research differentiating a healthy scepticism from an unhelpful cynicism may provide a useful framework through which to understand the role of trust in (mis)information discernment, and would likely align well with work on analytical thinking and (mis)information discernment (see for example Pennycook and Rand, 2019). Accordingly, distinguishing between healthy scepticism and unhelpful cynicism, and

incorporating these as distinct variables, may be useful in misinformation and constructive journalism research. Such a distinction would also assist in tailoring constructive journalism approaches to encourage healthy scepticism toward information, rather than aiming to increase trust unilaterally. A similar suggestion has also been made in a recent review of the misinformation literature, noting the need to integrate and balance gullibility toward misinformation, with an overabundance of distrust toward information (Pantazi et al., 2021).

7.3.6 Misinformation in context

While my first study found belief in COVID-19 misinformation was generally low in our samples, its negative correlation with protective behaviours in the United States sample contributes to suggestions of its negative influence (though not providing causal evidence). Such evidence has also been found across numerous other studies; though most are correlational, some also provide longitudinal evidence of the ongoing relationship between belief in misinformation and decreased protective behaviours (see for example, van Stekelenburg et al., 2021b). As such, the need for interventions which reduce misinformation still appear important, even if belief in it is relatively limited; particularly as repeated exposure is likely to increase the believability of the misinformation, even if this is not registered consciously by those exposed to it (Pennycook, Cannon, & Rand, 2018).

As noted in previous sections, current data suggests the extent of misinformation across online platforms to be relatively small in comparison to the overall content and often concentrated among a minority of users (e.g., see Guess et al., 2019, and Allen et al., 2020). Recent simulation work also suggests increasing consumption and acceptance of reliable information to be more effective at increasing global informativeness than reducing acceptance of misinformation (Acerbi,

Altay, & Mercier, 2022). Accordingly, it may be beneficial to tailor specific research and intervention programs for different epistemic groups, as discussed by Van Bavel et al. (2021).

In the context of constructive journalism, understanding of different epistemic groups and their relation to misinformation would also be helpful in understanding and testing the proposed mechanisms by which constructive journalism could reduce misinformation. As noted in Chapter Five, constructive journalism was proposed to reduce the belief and sharing of misinformation and misperceptions through (i) increasing engagement with information among those prone to avoiding or disengaging with information streams, (ii) reducing polarisation and encouraging civic public discourse, (iii) fact-checking, conveying and upholding standards of truth or factuality, (iv) reducing broad scale misperceptions, particularly through providing context and reporting on solutions and developments, and (v) increasing trust in news media and institutions by encouraging better and more accurate functioning of those institutions. While these mechanisms may impact across audiences, it is likely that their benefits will have a stronger reach and effect among some groups than others, just as constructive journalism is more likely to reduce the spread and belief of misinformation among some groups than others. I contributed to the beginning of testing some of constructive journalism's proposed effects in Chapter Six of this thesis, however, understanding the context of misinformation and its spread and belief in different groups would assist in understanding and tailoring constructive journalism to optimise its impact in the context of misinformation.

7.3.7 Constructive journalism: Implementation and effects

Turning to the implementation of constructive journalism, as iterated in Chapters Four through Six, the approach is still in need of considerable development. As noted within the interview studies, participants frequently had differing perspectives on what constituted

constructive journalism and how it could be used when reporting. Both implementation and evaluation of constructive journalism are reliant on a usable definition of the approach and its techniques. Educating journalists on the use of constructive journalism, particularly through its inclusion into university curriculums is an important stage in encouraging its use (see for example the curriculum at Windesheim University in the Netherlands[34]). While progress has been made on refining constructive journalism (see for example Hermans and Gyldensted, 2019), further work is needed to unify definitions of the approach and its techniques. The final study contributed to the evidence-base for constructive journalism by testing a wider range of techniques; including context, inclusiveness and diversity, and future orientation in addition to solutions and empowerment, and outcome variables, including trust and comprehension, than previous studies. However, further developments are also needed on research addressing the effects of constructive journalism, its operationalisation, and the methods used to investigate constructive journalism. Each of these will be stepped through in turn, beginning with operationalisation.

7.3.7.1 Operationalisation and definition of constructive journalism

Currently, studies on constructive journalism have, as previously iterated, predominantly focused on including solutions and positive angles in stories. Operationalisation should firstly look to include a broader range of techniques into constructive journalism studies, including: context, inclusiveness and diversity, future orientation, and co-creation. Many of these techniques were discussed by participants in the context of constructive journalism's applications to COVID-19 and misinformation, and should be included in testing of the approach. Studies should also be clear about the techniques included, the rationale for them, and the way in which they were operationalised. Given suggestions the stimuli strongly impact the results of specific studies

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[34] https://www.windesheim.nl/opleidingen/voltijd/bachelor/journalistiek

(Hermans & Prins, 2020), making the stimuli publicly available (e.g., on the Open Science Framework), would be beneficial in building an understanding of the approach and its effects separate from specific pieces. In Chapter Six, I presented a study following these suggestions (though not using the technique of co-creation), however, further replications are needed to build up the evidence base for constructive journalism approaches.

In addition to including a wider range of techniques, including those listed above, constructive journalism studies should investigate a wider range of formats. While some studies investigate broadcast news (e.g., Kleemans et al., 2018), or visual solutions (Dahmen, Thier, & Walth, 2019), the majority have tended to investigate online articles, as in Chapter Six. Given most news consumers, at least in the United States, access their news by television (Allen et al., 2020), the inclusion of a wider range of formats would be beneficial in understanding and implementing constructive journalism, and ensuring its benefits reach a wider audience. Additionally, use of a wider range of formats would assist in tailoring constructive approaches to various platforms (for example, news presented in static visual formats such as Instagram posts as compared to television, or online news websites).

As noted below, constructive journalism is also likely to affect different aspects of outcome measures in varying ways. Accordingly, it is important for constructive journalism studies to be explicit about the operationalisation of outcome variables. Variables such as trust, comprehension, and engagement, may have multiple facets, targets, or components, some of which may be impacted in opposing directions by constructive journalism manipulations. Some evidence of the influence of the chosen measures for outcome variables impacting the results was provided within both the study in Chapter Six, and work by Kleemans et al. (2018) on constructive journalism and comprehension. Increasing the clarity and quality of such measures will provide a better

understanding of constructive journalism and its effects. For example, in the case of trust, studies should be clear on the target of trust being measured, whether it is the information, the author, the outlet, or news media more broadly, and whether trust was measured using a multi-dimensional or single item scale. Such clarity would assist in understanding the effects of constructive journalism, particularly where they may be complex or highly contingent on external factors.

7.3.7.2 Methodology for investigating constructive journalism

My investigation of constructive journalism benefited from the use of both qualitative and quantitative methods to understand how journalism professionals viewed constructive journalism and its benefits, and to then test some of its proposed effects. Ongoing use of a range of methods would continue to be beneficial in investigating constructive journalism. Outside of survey and experimental research, longitudinal, quasi-experimental, and field experiment studies would assist in understanding the effects of constructive journalism over a prolonged period and in real-world contexts. As well as increasing external validity, such studies would assist in investigating effects which are proposed to take longer to change, such as trust, or large-scale misperceptions about the world. Such investigations would also assist in investigating effects on factors such as audience engagement. Where experiments are used, use of multiple stimuli may be beneficial to ensure results are not due to specific news stories, but rather to differences in constructive journalism approaches compared to control or comparison reporting approaches. Such methodology presents a trade-off in terms of demands on audience time and attention, as well as research costs, however, this trade-off may be beneficial in increasing the construct validity of constructive journalism experiments. Use of a broader range of measures would also be beneficial in elucidating the various effects of constructive journalism, as expanded below.

7.3.7.3 Effects of constructive journalism

Many of the effects of constructive journalism remain untested, particularly in response to a larger battery of tests. While the effects of constructive journalism on positive and negative emotions have been replicated and seem robust across studies on constructive journalism thus far (for a review see Lough and McIntyre, 2021), effects on other outcomes, such as trust, engagement, and comprehension, remain relatively understudied. I contributed to addressing this gap in Chapter Six, investigating the effects of constructive reporting techniques on trust and comprehension. However, further studies would help to replicate these findings, and other outcome variables which constructive journalism is proposed to effect, such as polarisation, should also be investigated, particularly in the context of misinformation.

The commercial aspects of constructive journalism have not been a focus of the thesis. However, further research understanding the impact of constructive journalism techniques on engagement, and long-term engagement, with news media would be beneficial in discussing its implementation with news editors and outlets, who have financial motives to consider. Similarly, virality of content is an important factor in the spread of (mis)information (Van Bavel et al., 2021; Vosoughi et al., 2018), and in the interests of news agencies, particularly commercial news agencies. Accordingly, it may also be beneficial to examine the extent to which constructive journalism pieces are shared and engaged with relative to other reporting approaches. While such research may be less focused on the societal benefits of constructive journalism, it is important in the extent to which it may assist implementation of the approach in various newsrooms and outlets.

Constructive journalism also poses promise for impacting many of the issue-specific outcome variables belief and access to misinformation is suggested to impact, such as action on climate change, responses to COVID-19, and attitudes toward humanitarian immigration. In

addition to potentially assisting in the reduction of misinformation spread through the mechanisms discussed in the third study, constructive journalism may increase self-efficacy through presenting solutions, increasing the relevance of news stories, and explaining possible responses or actions audiences can take concerning issues reported on; such as donating to charity or using clean energy (Baden et al., 2019). Constructive journalism can also assist responses by providing hope that change and solutions are possible, particularly on large scale issues such as COVID-19 or climate change. Such benefits were discussed by participants in the interview studies and are reflected in the relevant papers (Chapters Four and Five). The potential for such effects warrants investigation.

7.3.7.4 Evaluation of constructive journalism

In addition to investigation of effects, given differences in responses and implementation of constructive journalism reported by interview participants, conducting evaluations of the efficacy of different training programs would be beneficial in understanding how journalists and newsrooms respond to and take up constructive journalism in their reporting practices. Such an approach could also be combined with research into audience effects, assisting in developing the approach according to the needs and views of both journalists and consumers in an iterative fashion. Given participants differed in their understandings of constructive journalism, and suggested its applicability may also vary across national and topical contexts, an iterative approach would also assist in tailoring techniques according to place and subject matter.

In addition to education for journalists, education for audiences would also be beneficial in implementing constructive journalism. As noted previously, a concern for news outlets looking to implement constructive journalism is its uptake by audiences. Alongside digital literacy interventions, education on what constructive journalism is, and more broadly education regarding what constitutes quality journalism, would be beneficial for consumers of news to be able to better

discern and choose to engage with constructive and quality journalism[35]. Such education may also be beneficial in the uptake of constructive journalism. Previous works have drawn the analogy of constructive journalism to the uptake of healthier foods (see for example De Botton, 2014, though not explicitly mentioning constructive journalism), noting that just as we are naturally inclined to consume salty, sugary, and fatty foods despite their consequences for our health, so are we naturally inclined to consume negative, sensationalist, and polarising news, despite their consequences for our mental health or understanding of the world. However, just as education and the availability of healthy food has contributed to the ability of people to improve their diet, so too the education and availability of quality journalism may help consumers to improve their news and information diets. This analogy has a strong intuitive appeal, and such interventions certainly seem promising and worthy of investment, though they should be subject to empirical analysis and evaluation. Such empirical analysis and evaluation would also be beneficial in the context of educating editors, journalists, and audiences, both in ensuring such education is helping to contribute to positive outcomes, and in evincing the claims currently proffered on the benefits of constructive approaches to reporting. Given the burden of time in research and implementation of this nature, utilising existing and committed journalist and audience communities, such as that of De Correspondent[36], may be helpful.

In addition, ongoing workshops and available training programs which address responsible reporting on specific issues would be beneficial. One such example is Mindframe[37] in Australia,

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[35] As noted in the interviews, participants differed on the combination or separation of these terms, and on whether all journalism should be constructive or whether constructive journalism formed a subset of quality journalism. As such considerations depend greatly on the definition of constructive journalism proffered, here I maintain a separation between the concepts. Ideally constructive journalism would be quality journalism, but I do not propose it to be the only form of quality journalism.

[36] https://decorrespondent.nl/

[37] https://mindframe.org.au/

which encourages responsible media reporting of mental illness. A recent pilot study on a one-hour training workshop for journalism students found it was effective in reducing stigma and improving reporting on mental illness (Ross, Morgan, Wake, Jorm, & Reavley, 2021). The workshop was also considered valuable by the participants, suggesting such workshops may be useful and appreciated by journalists in incorporating best practice into reporting on issues likely to perpetrate misperceptions, such as mental illness and crime in this study. While the pilot study did not mention or draw on constructive journalism, many of the guidelines, such as considering how to report responsibly and including context, were similar to those discussed in relation to constructive journalism. Accordingly, constructive journalism may provide a useful framework contributing to the techniques and approaches applied to reporting of specific issues. Workshops drawing on constructive journalism features to improve reporting of specific issues may also be beneficial where journalists or editors are hesitant to incorporate constructive journalism due to certain stigma about the idea (as for example, concerns of it as 'fluffy' or overly positive news). Use of behavioural scales, such as that devised by Ross et al. (2021) would be beneficial in evaluating the efficacy of such workshops. Similarly, workshops' effectiveness could be tested using pilot studies with pre-/post-testing with measures relating to participants' comprehension of constructive journalism techniques, reporting intentions, and use of constructive journalism techniques when creating a short report. With participant permission, such reports could also provide useful stimuli to test audience effects of different forms of constructive journalism. As the influence of workshops and other training programs is likely to diminish over time, such evaluations would also assist in calibrating the optimum frequency of reminder training sessions.

As iterated previously, constructive journalism is not proposed here as a panacea, but rather an additional approach of benefit in the context of misinformation. A practical limitation of the

approach as an intervention against misinformation is that news outlets willing to take up constructive journalism are likely to be those already committed to strong journalistic principles. While this does not diminish the potential positive impact on their readership, it arguably may have limited influence among those populations and audiences who would most benefit from such changes to journalistic culture, but whose news outlets may be more resistant to incorporating constructive journalism principles. However, such a comment risks pre-emptively judging the willingness of various outlets to adopt constructive journalism approaches. Additionally, the training of young journalists in constructive journalism techniques may offer a way to change this culture, albeit slowly.

7.3.8 Constructive journalism and current interventions to reduce misinformation

I explored constructive journalism as a potential mitigator of misinformation and misperceptions, particularly where they are driven or facilitated by the mainstream media. However, as noted previously, misinformation is a complex problem, which is unlikely to be resolved by a single intervention. Accordingly, constructive journalism is not proposed as a panacea, and will likely provide the most utility where it is combined with other approaches and interventions. Such limitations were also acknowledged by participants in the third study, particularly regarding the capacity (or lack thereof) of news organisations to fact-check and respond to all potential misinformation. Accordingly, this section overviews some existing approaches to misinformation, and how constructive journalism integrates, complements, or builds on their effects.

Among existing interventions are digital literacy and inoculation effects[38], which have been demonstrated to improve discernment of misinformation in experimental and longitudinal work (Kozyreva et al., 2020; van der Linden et al., 2017), as have accuracy prompts and flagging content as potentially or explicitly false (Pennycook et al., 2020); though the latter have the benefit of shifting some burden away from solely individual responsibility. Similarly, debunking and fact-checking seeks to reduce belief in misinformation (Lewandowsky et al., 2020; Walter et al., 2020). Removal of false content and changes to incentive structures also seek to reduce the quantity and accessibility of misinformation, and to reduce its virality (Van Bavel et al., 2021). By extension, such changes may also contribute to a reduction in polarisation.

However, approaches to misinformation should also consider the extent of cognitive and moral burden placed on citizens in (mis)information discernment. Where citizens lack the resources to engage in such education or evaluation of information, the expectation that they are able to discern true from false information and do so consistently, while theoretically constituting the duty of a democratic citizen, may be unrealistic or demanding in the current information environment, and considering the other demands placed on individuals (such as work, family, and other personal responsibilities). In placing the burden of responsibility on individuals, consideration should also be given to the practical realities of many citizens daily lives, and the potential for such effort to lead to poorer consequences, such as those stemming from information overload, including disengagement/avoidance, anxiety, and satisficing (Bawden & Robinson, 2008). Accordingly, responses to misinformation need to balance approaches which improve individual discernment with those which reduce individual burden.

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[38] See section 1.6 of the introduction for greater detail.

Experimental work has found using easily scalable methods, such as reminders to check the accuracy of content, to encourage and incentivise accuracy on online platforms, though having a greater impact on truth discernment than sharing intentions (Pennycook et al., 2020). Such prompts appear to be an effective response to reducing the spread and consumption of misinformation where the main culprit is a lack of deliberation. Similar methods have also been implemented in respect to sharing articles without fully reading them. For example, reminders on Twitter to read articles before retweeting them (Twitter Support, 2020), which may assist in reducing the extent to which headlines are shared without the full article being read; a common occurrence (~60% of article shares) on the basis of current evidence (Gabielkov, Ramachandran, Chaintreau, & Legout, 2016). Given headlines can be misleading, particularly when designed to improve their virality, such reminders would be beneficial in reducing the extent to which genuine reporting contributes to misperceptions. Particularly given interventions such as constructive journalism rely to some extent on people engaging with the content of articles (though changes to reduce the extent to which headlines are misleading could also be effective in reducing misperceptions), such reminders could also assist in increasing the efficacy of positive changes to news reporting and other information dissemination.

Similarly, a crowdsourcing approach to fact-checking, in which online users are able to rate the accuracy of news articles thus providing an overall group judgement of accuracy, found group accuracy ratings to be comparable to professional fact-checkers, despite participants doing no outside research and having access to only the headline and lead of the news articles (Allen et al., 2021). A crowd-sourcing approach to fact-checking of news stories could assist in providing a gauge of news quality for consumers and providing news outlets with an understanding of reporting approaches which best convey information to their audience. However, as noted by the

authors, the approach may unfairly punish lesser-known producers, and consequently may contribute to the increased filtering and concentration of news sources to better-known brands at the expense of media diversity.

Another method discussed in the introduction was changes to incentive structures of social media platforms and politicians (Rathje et al., 2021). Such changes would also be beneficial in encouraging news outlets to produce less negative and sensationalised content (and thus potentially reducing their contribution to misperceptions, distrust, and polarisation), as part of the incentive to do so lies in the virality of such content. Such incentive structures could also be changed outside of online platforms, for example, in politics. Nyhan and Reifler (2015) found sending letters to politicians reminding them of the consequences of falsehoods reduced their sharing of misinformation. Similarly Formosa (2020) suggests that changing the incentive structures for politicians may be beneficial in encouraging more trustworthy politicians and therefore more trust. Constructive journalism may be helpful in such endeavours. Within the interviews with journalism professionals, participants discussed a negative focus in news media as discouraging people from entering politics due to the perceived likelihood of defamation in some form, or as encouraging sensationalist behaviour which captures the attention of the news media. By encouraging a critical, but socially beneficial focus in news media, incentives for politicians to make divisive statements may be reduced. Such a possibility should also be subject to empirical investigation.

Constructive journalism could also assist in reducing misinformation belief and spread by addressing disengagement, concerns of which are twofold in the context of misinformation. On the one hand is the contribution of disengagement to being uninformed. On the other is the increasing (mis)perception of polarisation encouraging apathy or disengagement; particularly where algorithms, online incentives, news culture, and cognitive predispositions for selecting

negative, emotive, and sensationalised content, emphasise extreme views and ignore moderate ones. The amplification of extreme views and relative silence on moderate ones was raised by participants in the interview study, particularly in relation to televised news debates. As noted by participants, and corroborated by various studies (see Skovsgaard and Andersen, 2020, for a review), key reasons for people becoming disengaged from the news and public debate include negative emotion, bias/sensationalisation, and helplessness. Given the relatively low rates of belief in misinformation, and the relatively low volume of misinformation according to current estimates (see for example, Allen et al., 2020; again noting that the relatively low volume does not discount the detrimental effects of misinformation), disengagement may also be a key issue in misperceptions and progress on societal challenges. Approaches which look not only to address misinformed beliefs, but also to encourage engagement with information sources and societal issues, and do so with the possibility for people to actively participate and feel a sense of self-efficacy, may be important contributors to progress on societal issues and to reducing the perception of society as divided and unable to act on such challenges. Based on the current work, constructive journalism is suggested as one such intervention. However, as noted earlier, such a possibility requires testing.

As a complex issue, misinformation is best combatted with a range of approaches which address both structural contributors and individual susceptibility. While changes to the structure of online platforms or news culture may be more intensive and costly than more easily scalable solutions, such as warnings to check information accuracy, the cost of such interventions should be considered in light of the reach of their impact. While approaches such as accuracy prompts are important and have demonstrated efficacy in experimental research, larger structural changes would ideally reduce the need for and reliance on these interventions (which is not to say they

would become useless or obsolete), and on those such as inoculation, which place the burden of information discernment on the individual. Additionally, as touched on in the introduction, there is some suggestion that misinformation and contributors to its spread, such as polarisation and distrust, are partially symptomatic of a broader sense of disconnect from or disillusionment with the promises and structures of society (Sandel, 2020). Such claims are often evinced by the growing gap in trust between socio-economic groups (see for example van Ham et al., 2017). While a broader and less directly related issue, understanding the extent to which decreased trust in governments and institutions, and increased support, belief, and sharing of misinformation are shaped by genuinely felt grievances with the performance of institutions would assist in understanding and addressing the broader factors contributing to the spread of misinformation. Such understanding would also assist in the implementation and assessment of interventions such as constructive journalism, which aim to address concerns of institutional performance, in addition to those of (mis)information spread and discernment.

7.3.9 Conceptualising the misinformation problem through systems thinking

As misinformation, and the concerns which surround it, such as low trust in institutions, including governments and news media, changes in technology, and growing inequality between socio-economic groups, are complex and multidisciplinary, I used a systems thinking to conceptualise misinformation and factors contributing to or reducing its belief and spread. Consistent with Ammara et al. (2021) and Baldassarri and Page (2021), I posit that systems thinking approaches provide a useful tool with which to conceptualise the different aspects of misinformation and polarisation, including how and where interventions, such as constructive journalism, could alter the information ecosystem and people's interactions with it. Using a systems thinking approach would also be beneficial in the emphasis it places upon possible

unintended consequences of seemingly straightforward solutions or those with short-term efficacy which may not last or may inadvertently exacerbate the problem (Meadows & Wright, 2009). I provide the beginnings of a systems map considering the factors contributing to the belief and spread of misinformation, however, further development and use of such maps by wider interdisciplinary teams would be beneficial.

As systems thinking considers the dynamic nature of social and psychological phenomena, its use would also be helpful when considering how effects and mechanisms relevant to misinformation, and the surrounding features, vary and adapt across contexts and time. Such a framework would benefit from a range of methods, as discussed in Section 7.3.4, as well as an interdisciplinary approach. As discussed in Section 2.2.1, a limitation of systems thinking, including within this work, is its vague definitions and the difficulty of implementing it practically. However, the approach has increasingly been used and advocated in research, and tools have and are being developed to conduct both quantitative analyses of dynamic (or complex) systems (Sugihara et al., 2020), as well as soft systems approaches, which are more conceptual in nature (Mingers & Taylor, 1992). In particular, soft systems approaches may be more accessible for a broader range of researchers and act as a useful conceptual tool, particularly when bringing together interdisciplinary researchers. However, quantitative systems methods would be beneficial in elucidating the circumstances under which different cognitive mechanisms are at play in the belief and sharing of (mis)information and how these shape and are shaped by external factors.

7.4 Conclusions

I investigated constructive journalism as a potential mitigator of misinformation spread and belief, and the mental health consequences of news media within the context of COVID-19. Based on an integration of findings and theory from psychology and journalism research, I hypothesised

51

that constructive journalism can assist in reducing misperceptions, negative emotion, polarisation, and distrust driven or exacerbated by news reporting. I further hypothesised that constructive reporting approaches can increase the positive effects of news consumption, including informativeness, healthy scepticism, and civic engagement. I sought to understand and test these hypotheses in the present thesis. The empirical investigations reported here draw together research on constructive journalism and misinformation and open avenues for an interdisciplinary program of research, spanning journalism and psychology, that explores the positive and negative impacts of news media on misinformation spread and belief. The findings from the thesis also inform constructive journalism theory, adding to both its conceptual and evidence base, and add to the list of possible strategies for combating the problem of misinformation. I do not propose constructive journalism as a panacea for issues of misinformation, rather, I argue it to be one approach with the potential to broadly influence factors contributing to the spread and belief of misinformation. Constructive journalism presents a promising approach to news reporting that could integrate with existing interventions and benefit from further interdisciplinary research and development. If effectively developed and implemented, constructive journalism could contribute to developing an information system that encourages an informed, engaged, and socially-conscious citizenry; who operate from healthy scepticism, rather than unhelpful cynicism (Cappella & Jamieson, 1997).

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Appendix 1: Bayesian and Frequentist Analysis

As in the case of quantitative versus qualitative methods, the debate between Bayesian and Frequentist statistics has a long history, with strong arguments and attempts to discount the alternate approach on both sides (Vallverdu, 2015). However, just as the value of using both quantitative and qualitative approaches is increasingly recognised (Danermark et al., 2001), so too have recent works increasingly pointed to the advantages of both Bayesian and Frequentist paradigms, and the use of the method most suitable to the object of study (Berger, 2010; Kass, 2011; Vallverdu, 2015). As with qualitative and quantitative research, many of the objections to this unification center on the seemingly irreconcilable philosophical differences of the approaches (Vallverdu, 2015). Accordingly, use of both necessitates an overview of their underlying assumptions and the rationale for their combination.

A central difference of Frequentist and Bayesian approaches is in their notions of probability – a summation of which is that Frequentist approaches view events as fixed, and data as random, while Bayesians view events as random, and data as fixed (van Zyl, 2018). The Frequentist paradigm of statistical analysis takes a long-run view of probability, with the idea that, were events to repeat indefinitely, they would settle on a true probability[39]. The values of events are seen to be fixed and true, and statistical tests are a way of evaluating these values as they exist in the real world. In practice, this means frequentists favour collecting a large number of trials from which the relative frequency of an event can be evaluated. Within the Frequentist framework, parameters are fixed and constant. Accordingly, uncertainty in estimates is attributed to variation between the sample and the population, or due to sampling error. In theory, provided we could

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[39] The classic example used here is that of an infinite coin flip – provided the coin was fair, we would observe heads 50% of the time, and tails 50% of the time, i.e., the probability would be p = .5.

sample all possible observations, we would be able to observe the true value of the parameter. However, as we are rarely in a position to sample all possible observations, we can use confidence intervals, conventionally set to 95%, which reflect that the true parameter would be within the bounds of the confidence interval 95% of the time (Kass, 2011).

Conversely, probability in the Bayesian framework is considered "a rational conditional measure of uncertainty" (Bernardo, 2011, p. 263, in Vallverdu, 2015). The Bayesian paradigm considers outcomes as probability distributions, known as posterior distributions, and is based on Bayes formula, as below:

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

Essentially, this formula calculates the probability of A given B, where B is the data/evidence/observation, and A is the hypothesis. As such, the Bayesian method calculates the posterior distribution on the basis of the likelihood multiplied by the prior, and divided by the probability of B being true (Vallverdu, 2015). As noted here, one of the key distinctions between Frequentist and Bayesian paradigms is in the use of prior distributions. The Bayesian framework allows the inclusion of prior information in calculations of probability, such that the outcome (the posterior distribution) is created by updating existing knowledge or predictions (P(A) in the formula above) on the basis of further data/observations (B). Essentially, this allows evidence or belief to be updated on the basis of prior evidence. Bayesian results also produce a different form of knowledge – instead of an estimate of the true value and the bounds within which we could expect to see the parameter a set percentage of the time, as in Frequentist statistics, we are given a distribution which quantifies our rational belief in the parameter. The Bayesian credible interval is often considered analogous to the Frequentist confidence interval, though with a more intuitive

explanation, as a 95% credible interval reflects that we can say with 95% confidence that the parameter lies within these bounds. Additionally, Bayesian methods provide a direct quantification of our evidence for the null and the alternative hypothesis (given prior evidence). An advantage of Bayesian methods is that they align much more readily and intuitively with our natural and untrained ways of conceiving probability and updating our knowledge of the world; unlike Frequentist principles and null hypothesis significance testing (NHST), which are renowned for being anti-intuitive (van Zyl, 2018). However, critiques of both schools exist, as briefly described below.

Criticisms of Frequentist and Bayesian paradigms

Frequentist

Key to criticisms of the Frequentist approach has been the use of null hypothesis significance testing (NHST), and controversy around the use and interpretation of p-values (see for example Cohen, 1994). Such debate is extensive, and will not be covered here, except to note the main arguments on either side. The basic principle of NHST is that we are able to quantify the probability of observing scores at least extreme as those in our dataset if the null hypothesis – typically that there is no effect/difference in conditions or relationship between variables – were true. The use of p-values then involves the researcher specifying a threshold of error they are willing to accept in rejecting the null hypothesis (i.e., the chance they will report an effect where one does not exist, or a type I error). While these thresholds vary by field and sub-discipline, conventionally the threshold is $p < .05$, or acceptance of a 5% Type I error rate.

However, as has been noted extensively, such practice has a few fundamental flaws. Firstly, rejection of the null does not constitute evidence for the alternative hypothesis (i.e., that the effect is due to the independent variable, or that the two variables vary together), however, p-values are

frequently interpreted as such. Arguably, the design of the study may justify making such claims, however, the practice still presents as problematic – particularly outside of an experimental paradigm where multiple explanations may exist. Additionally, using p-values what is calculated is the probability of the data given the null hypothesis, which is frequently then interpreted as the probability of the null hypothesis given the data, which, while having face value, constitutes a logical fallacy, as the probability of the inverse is not equivalent to the conditional probability. Again, this comes down to an issue of interpretation – the Frequentist framework does not provide a probability of the null, but the probability of observing scores as extreme as the ones we have given the null. While many researchers recognize this, there is a strong intuitive temptation to interpret p-values as the probability of the null (Cohen, 1994; van Zyl, 2018; Williamson, 2013).

Another concern in the use of null hypothesis testing is that of power and Type II error. While Type I error concerns making a false positive (i.e., reporting an effect where none exists), Type II error concerns making a false negative, or reporting no effect where one does exist. Typically, an acceptable level of power in studies is considered to be 80%, or acceptance of a 20% error rate. While the balance of conventional Type I and Type II error rates reflect the general supposition that it is less problematic to make a false negative than a false positive, underpowered studies present a problem when considering the replication crisis, as a lack of power, or consideration of power in interpreting the results of a study, can result in a series of seemingly contradictory results (Cohen, 1994; Gelman & Carlin, 2014). A common response to this has been the increased use and reporting of power and sensitivity analyses within study write-ups. Another issue related to NHST concerns not the statistical paradigm itself, but rather the publication bias toward positive results, which can result in an inflation of p-values and effect sizes (Cohen, 1994; van Zyl, 2018).

A common argument in favour of Frequentist statistics is objectivity – as noted below, a frequent criticism of Bayesian methods is their subjectivity, particularly in the inclusion of priors. However, the notion of objectivity has been soundly criticised, with critics noting that Frequentist statistical analysis is also based on assumptions that are not objective, and its inferences are highly dependent on the sample drawn (Vallverdu, 2015; van Zyl, 2018). Such dependence can also lead to poor research practices – such as variants of p-hacking (van Zyl, 2018). Nevertheless, Frequentist analyses are not without their benefits – both theoretical and pragmatic.

Theoretically, Frequentist statistics are useful in assessing models against data and making decisions regarding their efficacy, as they make a clear separation between the role of prior information and the estimation of model parameters (Little, 2006). The Frequentist framework also allows the specification of error rates (i.e., Type I and Type II error rates). Pragmatically, Frequentist calculations are much less computationally extensive, and accordingly can be performed much faster and with less difficulty. However, such differences are of less concern as computing power increases – a change to which much of the uptake of Bayesian statistics is often attributed (Vallverdu, 2015). However, this still presents a benefit particularly where, as detailed below, flat priors are used in Bayesian analysis – as these tend to produce results comparable to those of Frequentist statistics, though taking considerably more effort and computing time (Albers, Kiers, & van Ravenzwaaij, 2018). Even more pragmatically, though still influential, Frequentist statistics have long dominated research fields and statistics courses, meaning they are the more frequently used and thus understood of the two approaches – though Bayesian methods have been increasing in prevalence (van Zyl, 2018).

Bayesian

A key criticism of Bayesian statistics is, as above, that they are subjective. As previously noted, a common refutation is that all statistics are to some degree subjective, Bayesian analyses are just more explicit about this through the use of priors, which build a degree of subjectivity into the analytical process (van Zyl, 2018). Similarly, the influence of priors can be checked through sensitivity analyses, or by other researchers using different priors where the data are available (Van Dongen, 2006; van Zyl, 2018). Nevertheless, while there are guidelines for the selection of priors in Bayesian analysis, there are no explicit methods for their selection (Van Dongen, 2006)[40]. There is also argument that using uninformative priors[41] can also lead to skewed results, or else replicate those of Frequentist analysis while taking a longer amount of computing time (Albers et al., 2018; Gelman & Yao, 2020; Van Dongen, 2006). Similarly, there is argument that Bayesian analysis and Frequentist analysis will produce identical results given sufficient sample sizes (Albers et al., 2018). There is a greater risk of model misspecification in Bayesian analysis, as there is no 'objective' measure as such against which the models can be tested; while the Frequentist framework contains many methods of model estimation (Little, 2006).

However, Bayesian analyses also offer a number of useful benefits – again, both theoretical and practical. Firstly, as already described, Bayesian statistics allow us to quantify the certainty of evidence for our hypothesis and alternative hypothesis, which is often what we are interested in addressing. Secondly, that Bayesian analyses allows the inclusion of context and prior evidence, thus reflecting an arguably more natural process of learning. Additionally, this updating of

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[40] Differences in prior specifications have also led to the fracturing of Bayesians into multiple schools of thought – such as objective and subjective Bayesians (Little, 2006).

[41] Uninformative has also been criticized as misleading – uninformative priors still influence the data, however, as they are flat distributions, they are presumed to be more sensitive to the evidence supplied in the data.

evidence in the light of previous evidence, allows data to be collected and estimates updated on a rolling basis, unlike the Frequentist framework in which data collection must be stopped at a certain point, and the data not inspected prior to the stopping point (van Zyl, 2018; Williamson, 2013). Bayesian methods are also often more suited to complex models, and to small data sets[42] (Muthén & Asparouhov, 2012; Smid et al., 2020; Vallverdu, 2015).

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[42] However, Smid, McNeish, Miočević, and van de Schoot (2020) note that in small sample sizes the results are more sensitive to the choice of priors.

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Appendix 2: The effects of constructive journalism techniques on mood, comprehension, and trust (Published version)

The effects of constructive journalism techniques on mood, comprehension, and trust

The role of news media in the perpetuation of misinformation has faced increasing scrutiny. Concerns have been raised about news media's negative influence on mental health, increasing news avoidance, and decreasing trust in news. Constructive journalism is proposed to increase engagement with and trust in news media, reduce the mental health impact of news consumption, and provide a more accurate view of the world. However, constructive journalism studies primarily investigate the inclusion of solutions and positive emotions in news stories, to the exclusion of other techniques. Additionally, few studies have investigated constructive journalism's effects on trust and comprehension. We used a randomised-controlled repeated-measures experimental design to investigate the effects of a comprehensive set of constructive journalism techniques on mood, comprehension, and trust among 238 Australian participants. Participants who read constructive articles reported higher positive emotion, and lower negative emotion, compared to participants who read the same articles without constructive features. However, participants in the constructive condition demonstrated worse comprehension than participants in the control, an effect partially mediated by negative emotion but not effort. No significant differences in trust in journalism as an institution or in article content were present between groups. However, when accounting for interest, constructive journalism demonstrated a significant negative effect on trust in the information, though positive where it increased mood. Further research is needed to calibrate techniques which balance the positive effects of constructive journalism with its ability to convey information.

1. Introduction

Journalism – along with numerous institutions in Western democracies - is experiencing a crisis of trust (Fisher et al., 2020). Despite trust increasing at the onset of COVID-19, the Reuters Digital News Report found 50% of a global sample across 46 markets to report trusting the news they use, and less the news in general (Newman et al., 2021). While trust in news and use of news sources appear modestly related, low trust in news is associated with use of non-mainstream sources, including those spreading false and/or partisan news (Strömbäck et al., 2020). While trust in mainstream news sources is declining, concern of news media's impact on mood and mental health is rising, particularly throughout COVID-19 (Boukes and Vliegenthart, 2017; Newman et al., 2021). Similarly, concerns have been raised regarding misperceptions driven, intentionally or

otherwise, by selection and editorial processes in journalism (Haagerup, 2017; Tsfati et al., 2020). Constructive journalism is proposed to address concerns of news media perpetuating misperceptions and impacting mental health. However, evidence for constructive journalism techniques and their impact is relatively sparse. We contribute to this growing literature by probing the effects of constructive journalism techniques on consumer mood, comprehension, and trust, using a randomised controlled repeated-measures experiment.

1.1 Constructive journalism

A relatively recent approach to reporting, constructive journalism aspires to be socially responsible and to report accurately and contextually on matters of societal importance without sensationalising or overemphasising the negative (Bro, 2019). Additional to addressing news media's negativity bias, constructive journalism critiques traditional news approaches, including top-down communication of news, and lack of diversity and nuance in views portrayed in mainstream media (Hermans and Drok, 2018). Constructive journalism has emerged among similar movements, including civic journalism, solutions journalism, and peace journalism, which share aspects of constructive approaches (Bro, 2019).

Constructive journalism has grown from two distinct schools of thought in the work of journalists Gyldensted (2015) and Haagerup (2017). Gyldensted's (2015) approach draws on positive psychology, including the PERMA model (McIntyre and Gyldensted, 2017), and Fredrickson (2001)'s broaden and build theory. According to Bro (2019) her approach is active, emphasising how news affects audiences and society. Haagerup's (2017) approach focusses more on cognitive heuristics and biases, with greater emphasis on portraying "the most obtainable version of the truth" (Rosling, Rosling, and Rönnlund, 2018), and changes to the selection and editorial processes of journalism; a more passive approach according to Bro (2019).Both share many similarities, including the importance of solutions, context, and promotion of democratic conversation. Constructive journalism is frequently conflated with solutions journalism, the latter term often used in the United States (Lough & McIntyre, 2021). However, solutions journalism is better considered a subset or form of the broader constructive journalism approach (Lough & McIntyre; McIntyre & Gyldensted, 2017).

Efforts to clearly define constructive journalism include six techniques developed by agreement from journalism faculty at Windesheim University. As reported in Hermans and Gyldensted

(2019), these include: *Solutions* includes adding a solution-oriented frame when covering problems. *Future orientation* incorporates the question 'what now?' and considers paths to potential futures. *Inclusiveness and diversity* involves working against polarising dynamics, and including a wider variety of voices and perspectives. *Empowerment* involves questions and angles which address possible resources, solutions, collaborations, and common ground, and move beyond victim or disaster frames. *Context and explanation* ('the Rosling') involves providing context and explanation to news, including through visualisations and data. *Co-creation* involves engaging with and empowering the public and co-creating news content.

Criticisms of constructive journalism include unclear definition, proximity to activism, and being too positive/insufficiently critical (Bro, 2019). Proponents have refuted constructive journalism as too positive, noting critical reporting is important and not precluded by inclusion of solutions and developments; nor does such inclusion require journalists to become activists (Bro, 2019; Gyldensted, 2015; Haagerup, 2017).

Despite its critics, constructive journalism has gained ground, with prominent outlets incorporating constructive techniques (The Guardian; The New York Times). Irrespective of constructive journalism's definition, several empirically testable claims can be gleaned from extent theoretical work. We focus on testing claims that constructive reporting techniques, as outlined by Hermans and Gyldensted (2019), increase trust in news, improve mood (or temper news' negative impacts on mood), and increase the accuracy of consumers' views about the world or their comprehension.

1.2 News media and mental health

Analyses of news media suggest a disproportionate tendency toward selecting negative stories (Soroka, 2012). Such bias can lead to negative emotion and negative mental health consequences caused by consuming news (Baden, McIntyre, and Homberg, 2019). In experimental and longitudinal research, consumption of news media increases depression, helplessness, distrust, and anxiety, and reduces perceptions of others as altruistic and well-meaning, leading consumers to focus upon their own security and less upon others, and to experience apathy, denial, and fatalism (Baden, McIntyre, and Homberg, 2019; Boukes and Vliegenthart, 2017; de Hoog and Verboon, 2019; McIntyre, 2015). COVID-19 has highlighted news media's impact on mental health, with numerous studies finding news exposure associated with anxiety and depression (Gao et al., 2020;

Ko et al., 2020; Yao, 2020). Besio and Pronzini (2014) also theorise news media to diffuse values and moral expectations, with negative news providing less examples of positive behaviour.

As evidence of negative mental health consequences of traditional news reporting methods mounts so does support for constructive journalism, as a tool for increasing positive emotions among consumers and reducing the negative consequences of news consumption (Baden et al., 2019). Longitudinal (McIntyre, 2020), and experimental work has found participants assigned to read constructive news report increased positive emotion, and reduced negative emotion, relative to participants in control conditions (Baden et al., 2019; Hermans & Prins, 2020; McIntyre, 2015; McIntyre & Gibson, 2016; McIntyre, 2019). However, most studies have operationalised constructive journalism by including solutions or positively-valenced content. While key constructive journalism elements, a wider range of techniques remain to be tested experimentally (Hermans & Prins, 2020). Accordingly, we developed news articles containing techniques from Windeshiem University: solutions, positive emotions, a future orientation, inclusiveness and diversity, and context. We expected the present study, with a more comprehensive and higher fidelity constructive journalism manipulation, to replicate previous findings, namely: consumers reading articles with constructive features will report more positive emotion (Hypothesis 1), and less negative emotion (Hypothesis 2), than those in the Control condition.

1.3 Constructive journalism and comprehension

Concerns have also been raised about news media perpetuating misinformation and consumer misperceptions, particularly given its negativity bias. Even where factual, emphasis on negative news contributes to distorted perceptions of a more dangerous and less developed world than reasonable evidence would support (Rosling et al., 2018). Constructive journalism, through inclusion of developments, solutions, and responses to disasters, is considered to provide a more accurate or balanced view of the world (Haagerup, 2017).

The inclusion of context is also proposed to reduce misperceptions resulting from reliance on heuristic evaluations (Haagerup, 2017). However, we are naturally predisposed to respond and attend to threats, with negative emotion repeatedly found to draw increased attention, and therefore increase processing and retention of negative information (Lang, 2000; Soroka, Fournier, and Nir, 2019). Lang's (2000) Limited Capacity Model of Mediated Message Processing (henceforth LCM)

proposes the ability to encode, store, and retrieve information is impeded by limited mental resources, suggesting memory may be limited where information takes more effort to process.

To our knowledge, the only previous study on constructive journalism and comprehension was conducted with children, using televised news with mixed results (Kleemans et al., 2019). While recall of news content was higher among control participants, children better recalled broad details in the constructive condition (Kleemans et al., 2019). Neither effect was mediated by negative emotion. The authors called for further research into constructive journalism's effects on comprehension, including consideration of effort exerted across conditions.

Accordingly, we expected constructive reporting techniques to affect comprehension but, considering prior findings, did not have strong predictions about the effect's direction (Hypothesis 3). Consistent with the LCM predictions (Lang, 2000), that negative emotion can increase, and effort decrease, retention, we expected constructive journalism's effect on comprehension to be mediated by negative emotion (Hypothesis 3A) and effort (Hypothesis 3B). .

1.4 Constructive journalism and trust

Depsite ongoing discussion of trust in journalism, recent reviews find discrepancies on fundamental questions, including how and at which level to measure trust, to what extent trust in news impacts use, or whether trust in news is desirable (Fisher, 2016; Fisher et al., 2020; Strömbäck et al., 2020). Complicating trust in news is the wider variety of sources and capacity for audience selection, often favouring attitude-consistent information, in high-choice information environments, . Such environments increase competition, including from alternative and partisan sources, "fake news" sites, and direct communication by politicians/public figures; many of which attack the credibility of mainstream news (Strömbäck et al., 2020). Trust is similarly complicated by unclear definitions, differences across platforms, and differences between trust in journalists, outlets, or news media as an institution (Fisher, 2016; Strömbäck et al., 2020). Despite these challenges, trust is considered important for journalists and news media to inform the public (Fisher et al., 2020; Strömbäck et al., 2020).

A review found news use and news trust moderately correlated, with low trust in news repeatedly associated with using alternate and potentially partisan sources (Strömbäck et al., 2020). Such media diets may facilitate misinformation sharing and exposure. Additionally, trust in journalism relates to trust in other institutions. Though unable to draw causal inferences, Hanitzsch, Van

Dalen, and Steindl (2017) found evidence of a 'trust nexus' between news media and politics. Despite increased access through social media, institutions/governments are often still accessed and assessed through news (Citrin and Stoker, 2018). Decreasing trust may reduce governmental and institutional capacity, contributing to cycles of distrust where low trust hinders positive change, reducing trust, etc.

A mixed-methods investigation found audience reasons for low trust in journalism to include bias, political and commercial; and poor journalism, including exaggeration or sensationalisation, inaccuracy and low standards, and conflicting information (Nielsen and Graves, 2017). When surveyed, audiences in Australia, the population we sampled, suggested trust in news could be improved by reducing bias and opinion, declaring conflicts of interest and political standpoints, and increasing in-depth reporting (Fisher et al., 2020). While initiatives varied across demographics and existing levels of trust, techniques proposed in constructive journalism such as context and greater diversity of views, appear promising for increasing trust.

Concerning misinformation, constructive journalism is suggested to increase trust in news by making the distinction between genuine journalism and 'fake news', often negative and sensationalised, clearer (Egelhofer and Lecheler, 2019). Proponents of, and news agencies interested in, constructive journalism have also emphasised its ability to increase trust (Constructive Institute, 2020; Ross, 2020). Theoretically, constructive journalism's commitment to societal benefit and inclusion of positive emotions align with perceptions of benevolence and feelings of warmth, components contributing to trust (Mayer, Davis, and Schoorman, 1995). Similarly, Beckett and Deuze (2016) argue emotional authenticity increasingly determines the trustworthiness of journalism.

Despite theoretical grounds for constructive journalism increasing trust, evidence is limited and contradictory. Thier et al. (2019) and the Solutions Journalism Network (2021) found solutions reporting, sometimes conflated with or considered a sub-set of constructive journalism though distinct from the broader movement (Lough & McIntyre, 2021), can increase consumer trust. However, Meier (2018) found constructive articles containing "hope, prospects and proposed problem solutions" (p.769) thought marginally more likely to contain concealed advertising; potentially indicating constructive journalism contributes to distrust. Both effect sizes were small.

We measured trust in the article content, and in journalism as an institution, to investigate constructive journalism's effects on trust under experimental conditions. Consistent with current literature, we predicted consumers reading constructive news articles would report greater trust in journalism as an institution (Hypothesis 4) and in the articles' contents (Hypothesis 5) than in the Control condition.

1.5 This study

While constructive journalism has been suggested to produce positive outcomes, its evidence base is relatively small and predominantly examines solutions and positive emotions. We extend the evidence base for constructive journalism, investigating a wider variety of constructive techniques and their effects on comprehension, trust, and mood.

We included interest as a covariate. Interest has previously exerted a general influence on audience responses, including positive and negative emotions (Hermans and Prins, 2020; McIntyre, 2019). Effort was included as an exploratory covariate, as humans are cognitive misers who avoid expending mental effort where possible, and are more likely to believe, retain, and trust easily processed information (Koch and Forgas, 2012), and is likely to influence comprehension (Lang, 2000).

Given rising interest and implementation of constructive journalism approaches, further empirical testing is needed. Constructive journalism may be useful in alleviating reporting's impact on consumer mental health, comprehension, and trust. Conversely, such approaches may have unintended or null effects equally important to understand.

2. **Methods**

2.1 Sample

Australian participants were recruited through Prolific Academic, an online crowdsourcing platform, and reimbursed £1.80 for participating (Prolific, 2019). Participants who completed the study in under 5 minutes were excluded as they would not have had time to read the articles. A priori power analysis suggested 200 participants with four trials each would provide sufficient power ($\beta = .8$), to detect an effect of $d = .28$, or eta-squared = .012 (Faul et al., 2009). The final sample comprised 238 participants and was approximately evenly separated across gender, though

younger and more educated than the general population (Australian Bureau of Statistics, 2016; Table 1).

2.2 News Articles

Articles were developed from constructive journalism pieces recognised by the constructive journalism network, or outlets (e.g., *Fixes* in *The New York Times*). Thirteen pre-existing articles were edited to reduce length and produce a Control and Constructive condition, guided by six elements described by Windesheim University for use in the constructive journalism curricula. These build on a combination of techniques derived from Gyldensted (2015) and Haagerup's (2017) approaches, including: solutions, future orientation, empowerment, inclusiveness and diversity, context/The Rosling, and co-creation (Hermans & Gyldensted, 2019). As our interest was in constructive journalism's effects as an overall approach, and not specific techniques, multiple constructive journalism techniques matching the article were included. The exact combinations are available in the article guide at https://osf.io/8gt4u/. Control versions were generated by removing constructive elements. Articles in both conditions were approximately equal in length, and kept consistent in other features to reduce confounds. Where images were overtly positively or negatively-valenced, or demonstrated solutions/conflict, we swapped them for neutral images used across conditions. Headlines and subheadings were adjusted between conditions, though of approximately equal length.

The articles were independently reviewed by two constructive journalism experts (the fourth and fifth authors) and two lay reviewers who blindly sorted the articles into constructive and non-constructive categories as a manipulation check — all articles were correctly classified. Five articles, each with a Constructive and Control version, were selected as the final stimuli in consultation with all reviewers by their fidelity to constructive journalism and balance across conditions. Article topics included: Foster youth in the United States (Huffpost); conservation of Boreal forests (Huffpost); alternative jet fuels (Reset); children in Israel and Palestine (The New York Times); and cities in Uganda (The Guardian). Five of the six constructive journalism techniques were present in the Constructive condition, with co-creation not in the available articles. To reduce confounds, author names and outlets were removed, though formatting was otherwise consistent with the original articles. Affiliations and links to the original articles were provided in the end matter.

The manipulation was checked using sentiment analysis with the tidytext package in R; constructive articles had higher positive valence (Silge and Robinson, 2016); and a Flesh-Kinkaid readability test to ensure equivalent levels of complexity across conditions (Web FX, na). Stimuli, changes, checks, and links to original articles are available at https://osf.io/8gt4u/.

2.3 Measures

Trust

Trust in the information was measured with a single item after each article: "To what extent do you trust the information in this article" from 0 = *Don't trust at all* to 10 = *Trust completely.*

Trust in journalism was measured with Strömbäck et al.'s (2020) scale, using the question stem "Generally speaking, to what extent do you agree or disagree with the following statements about the news media:" followed by five statements such as "the news media are fair when covering the news" on a 7-point Likert scale from 1=*strongly disagree* to 7 = *strongly agree.* Cronbach's alpha was acceptable ($\alpha = .90$).

Mood

Mood was measured with a single item after each article: "How did the information in this article make you feel?" on a scale from 0 = *very negative* to 10 = *very positive.* This measure was a covariate in the linear mixed-effects model.

Positive and negative emotion as outcome variables were measured using the I-PANAS-SF (Thompson, 2007). Following all articles, participants were asked "Thinking about yourself and how you feel right now, to what extent do you feel:" followed by ten emotions (five positive and five negative) responded to on a five-point scale from 1 = *never* to 5 = *always.* Cronbach's alpha for both scales was acceptable ($\alpha = .79$).

Comprehension

Comprehension was measured using six recognition and recall questions. Participants were asked "Please select as many of the 5 stories you saw here today as you can remember." from a list of 11 stories. Participants then responded to a multiple-choice question for each article on facts consistent across conditions. A score of one was given for each correct response; forming a comprehension measure from 0 to 10.

Interest

Interest was measured after each article with the item "How interested are you in the topic you just read?" from 0 = *Not at all interested* to 10 = *Very interested.*

Effort

Effort was measured after each article with the item "How much effort did it take to read this article?" from 0 = *No/very little effort* to 10 = *A lot of effort*.

News use and interest

Items measuring Participants' use and interest in news were adapted from the Reuters Digital News Report (Newman et al., 2021). Use: "Typically, how often do you access news? By news we mean national, international, regional/local news and other topical events accessed via any platform (radio, TV, newspaper, podcast, or online including social media)." 0 = *Never* to 9 = *More than 10 times a day*.

Interest: "How interested, if at all, would you say you are in news?" 1 = *Not at all interested* to 5 = *Extremely interested.*

2.4 Procedure

The study used a randomised-controlled repeated-measures experimental design. Participants were randomly allocated to either the Constructive or Control condition and read five articles embedded as PDFs within Qualtrics with (Constructive) or without (Control) constructive features. After each article participants responded to four single-item questions as above (mood, interest, effort, trust). While the use of single- rather than multi-item response scales have been questioned as measures of general constructs like trust and effort (e.g., Strömbäck et al., 2020), they were a better fit as contextual measures of response to each article in our experiment, and reduced participant burden. After reading all articles, participants completed the PANAS and trust in journalism scales, items pertaining to news use and interest, comprehension questions, and demographics. The study was piloted to check timing and usability of the study interface.

2.5 Data analysis

Data was cleaned and analysed using R version 4.04 (R Core Team, 2019). Data were visualised and investigated for non-normality. Differences between conditions on outcome variables were

tested using exact permutation tests with the coin package (Hothorn et al., 2006). Exact permutation tests allow comparison of the test statistic to a distribution produced by resampling the data without replacement for all possible permutations of the data. Such tests do not rely on assumptions about the data distribution and provide exact p-values based on the sample, rather than a theoretical distribution.

As effect sizes for trust measures are often small (e.g., Thier et al., 2019), we used a linear mixed-effects model with the single-item measures to investigate constructive journalism's effect on trust with greater power, whilst including covariates. The linear mixed-effects model included participants and articles as random effects to account for non-independence and variation due to stimuli and individual differences. The covariates mood, interest, news use, and news interest were entered as fixed effects, as was condition (Control/Constructive). Interest and mood were entered as moderators of the condition. The fully specified model is below:

$$trust \sim mood + interest + news\ use + news\ interest + condition + mood * condition$$
$$+ interest * condition + (1|participant) + (1|article)$$

The model was estimated using the lme4 package in R (Bates et al., 2015). All numerical variables were scaled prior to estimation for ease of interpretation. Model assumptions were checked using the DHARMa package (Hartig, 2021). P-values were estimated using Satterthwaite's method to estimate degrees of freedom and significance. Models, checks, and data are available at https://osf.io/8gt4u/.

3. Results

The randomisation appeared successful, as differences in gender, education, age, news use, and news interest were non-significant between conditions (Table 1).

Table 1

Participant characteristics (N=238)

Variable	N (Constructive)	N (Control)	% sample
Gender			
Male	61	56	51.3
Female	57	61	47.5
Non-binary/Prefer not to say	1	2	1.3
Age			
18-24	28	26	22.7
25-34	47	51	41.2
35-44	23	21	18.5
45-54	11	12	9.7
55-64	7	7	5.9
65-74	2	2	1.7
75-84	1	0	0.4
Education			
Did not complete high school	5	4	3.8
Year 12	12	19	13.0
TAFE certificate or diploma	10	5	6.3
Some university but no degree	9	6	7.6
Undergraduate	11	7	40.8
Post-graduate diploma	46	51	6.3
Masters	17	18	14.7
Doctorate	9	9	7.6
	M (SD)	M (SD)	Range
News use	6.23 (1.64)	5.98 (1.78)	0-9
News interest	3.39 (0.82)	3.33 (0.91)	1-5

3.1 Effect of constructive news on emotion

Consistent with hypothesis one, positive emotion was significantly higher among participants in the Constructive than Control condition, with a moderate effect size (Z = 3.94, p < .001, d = .53; Figure 1).

[insert Figure 1]

Consistent with hypothesis two, negative emotion was significantly lower among participants in the Constructive comparative to Control condition, with a small-moderate effect size (Z = -2.68, p = .007, d = .35); Figure 2).

[insert Figure 2]

3.2 Effect of constructive news on comprehension

Consistent with hypothesis three, differences in comprehension across conditions were significant. Comprehension was higher in the Control than Constructive condition. The effect size was again small-moderate (Z = -3.14, p = .002, d = .42; Figure 3).

[insert Figure 3]

Following recommendations by Kleemans et al. (2019), and predictions by the LCM (Lang, 2000), constructive journalism's effect on comprehension was tested with negative emotion as a mediator. Consistent with hypothesis 3A, the effect was significant (b = .07, p = .032, 95% CI [0.004, 0.17]), but small, accounting for 11.7% of the variance explained by condition, suggesting it was not the sole explanation for differences in comprehension. Effort had no significant effect as a mediator (b = -.01, p = .56, 95%CI [-0.06, 0.02]), inconsistent with hypothesis 3B and suggesting effort did not explain significant difference in comprehension across conditions. As an exploratory analysis, we investigated interest as a mediator, but found no effect.

3.3 Effect of constructive news on trust in journalism

Inconsistent with hypothesis four, differences in trust in journalism were non-significant, indicating no effect of the Constructive condition on participant's trust in journalism as an institution relative to the Control (Z = -.50, p = .624, d = .07; Figure 4).

[insert Figure 4]

3.4 Effect of constructive news on trust in the information

Compared to a null model containing only the intercept and random effects, the linear mixed-effects model investigating predictors of trust in the information was significant ($\chi^2(7) = 1712$, p < .001, AIC = 2736.6). Interest had a significant positive effect on trust (Table 2). The results provide mixed evidence concerning hypothesis five; condition (Constructive/Control) was not a significant predictor where no covariates were present (condition only), however, once accounting for interest, the Constructive condition negatively effected trust, except where moderated by mood, under which conditions it positively effected trust. For plots on interest, mood, and trust data, see appendix.

Table 2

Estimates for fixed effects of linear mixed-effects model predicting trust in the information

Variable	Estimate	Standard Error	t	df	p-value	95% CI
Intercept	.05	.08	0.59	26.73	.56	[-.11, .21]
Mood	.02	.04	0.35	976.96	.72	[-.07, .10]
Interest***	.35	.04	9.88	1172.73	<.001	[.28, .42]
News Use	.04	.05	0.80	232.00	.42	[-.06, .15]
News Interest	-.35	.04	-0.22	238.80	.83	[-.12, .09]
Condition (Constructive)*	-.23	.10	-2.36	297.55	.02	[-.41, -.04]
Mood:Condition (Constructive)***	.24	.06	4.23	1172.73	<.001	[.13, .35]
Interest:Condition (Constructive)	-.09	.05	-1.69	1159.32	.09	[-.19, .01]

4. Discussion

We investigated constructive journalism's effects on mood, comprehension, and trust using a randomised-controlled repeated-measures experiment. Participants were randomly assigned to read articles adapted from recognised constructive journalism pieces containing constructive journalism techniques (Constructive) or the same articles without constructive elements (Control). They rated their interest and trust in the articles, how the articles made them feel (their mood), and the level of effort required to read the articles before completing measures of mood, comprehension, and trust in journalism.

Our findings show constructive journalism can have mixed effects – while our manipulation increased positive and decreased negative emotion, we found a decrease in comprehension, and a

null effect on trust. Moreover, when accounting for self-reported interest in the articles, constructive stories negatively affected trust in the information, though constructive stories positively affected trust where they improved mood.

Our finding that participants in the Constructive condition reported higher positive and lower negative mood relative to those in the Control replicates and extends previous findings in constructive journalism by investigating a wider range of techniques and topics (e.g., Baden et al., 2019; Hypotheses 1 and 2). Given concerns of news media's impact on mental health, including throughout COVID-19, such findings contribute to suggestions constructive journalism can reduce this impact, including where techniques such as inclusiveness and diversity, context, and future orientation are employed (Baden et al., 2019; Boukes and Vliegenthart, 2017). As the main reason for news avoidance is negative mood, such findings warrant investigation into whether constructive journalism reduces news avoidance; currently evidence suggests constructive reporting to increase engagement, though findings vary (Baden et al., 2019; Hermans and Prins, 2020; McIntyre, 2019; Skovsgaard and Andersen, 2020).

While constructive journalism may address concerns of the negativity and mental health consequences of news, a key aim of journalism is to inform. Participants scored higher on the comprehension measure in the Control condition, indicating constructive journalism negatively affects comprehension, consistent with Kleemans et al. (2019; Hypothesis 3). While seemingly contrary to claims of constructive journalism providing a more accurate worldview, our comprehension measure comprised recognition questions concerning discrete pieces of information in both Constructive and Control articles. The LCM suggests negative emotion increases attention and retention of detailed information – though stronger for recall than recognition (the latter measured here; Lang, 2000). Negative emotion accounted for a small portion of variance, and effort was non-significant, as a mediator; suggesting alternative explanations for differences in comprehension, and potentially an alternative theoretical lens for explaining constructive journalism's influence on comprehension, may be needed.

While constructive journalism may reduce retention of information, recall of specific figures and information does not capture overall judgements and perceptions. Constructive journalism is suggested to improve overall perceptions of developments and context around events, potentially better captured by open-ended and more interpretive questions, or those employed by GapMinder

to measure general misperceptions about developments (Gapminder, 2021). Given Kleemans et al. (2019) found children to exhibit worse recall for basic, but better recall of broad information, about a reported event in Constructive comparative to Control conditions, future research may investigate how and to what extent comprehension varies across different domains in response to constructive journalism. As a key role of journalism is to inform, understanding why and under what conditions constructive journalism contributes to increases or decreases in comprehension posits an important area of investigation. Understanding the mechanisms behind differences in comprehension would help tailor constructive journalism techniques to specific reporting purposes and educate journalists to use them in a manner that minimises negative and maximises positive impacts. Further research isolating whether individual techniques effect comprehension differently would assist journalists when considering the aims of individual stories, and where constructive elements could best serve to reduce negative emotion without impeding comprehension.

A commonly proposed but rarely tested benefit of constructive journalism is an increase in audience trust, considered crucial as news avoidance and concerns of misinformation increase (Strömbäck et al., 2020). However, we found no significant differences between conditions on trust in journalism. While contrary to suggestions of constructive journalism advocates, trust in journalism as an institution may be relatively stable, and unlikely to be moved with a small set of articles and short timeframe. Longitudinal research may be better suited to measure broader level changes in trust. Additionally, the null effect on trust in journalism may be due to the target measured. As previous work found solutions journalism audiences to report higher than average trust in outlets, constructive approaches may increase trust in particular brands, without increasing trust in journalism overall (Thier et al., 2019). Alternatively, solutions reporting may increase trust, while other constructive journalism techniques may not, and may potentially decrease trust (see also Meier, 2018). Future work could compare trust across targets, and in response to individual techniques.

More surprising is the finding that participants reported less trust in the article contents in the Constructive condition once accounting for interest, though reporting higher trust in the Constructive condition where articles increased mood. There are a few takeaways. Firstly, no significant differences between conditions existed before accounting for other variables, suggesting constructive reporting techniques do not decrease trust in the information provided they increase mood and interest. In this study, mood was significantly higher in the Constructive than

Control condition. Nevertheless, that participants reported less trust once accounting for interest bears examination. While our present data is insufficient for further empirical investigation, we venture some potential explanations below.

As previously, differences in trust may be due to the target, the article content. As previous research has found participants more suspicious of hidden advertising in Constructive conditions (Meier, 2018), participants may have been more sceptical of hidden motives in the constructive stories. This possibility could be explored by asking about perceived motives or possible advertising in future studies, and/or including open-ended or interview questions on participants' reasons for (dis)trusting articles. Qualitative research would be beneficial regardless in providing a more in-depth understanding of what leads to (dis)trust in experimental stimuli, and moving beyond pre-conceived explanations. Previous researchers have suggested constructive journalism may appear less credible due to the predominance and familiarity of negative news, increasing scepticism toward less familiar constructive reporting (Rusch et al., 2021).

Another potential explanation is that participants are generally sceptical of news and therefore reluctant to report complete trust in the information. Scores on the trust in journalism scale averaged approximately 40%, and maximised at 80%, of the total possible score; reflective of the generalised scepticism reported in previous studies (Nielsen and Graves, 2017), and potentially leading to a flattening of scores across conditions. Additionally, while Australian audiences suggested changes advocated by constructive journalism, such as more in-depth reporting, would increase trust, this was among those already predisposed to trust the news (Fisher et al., 2020). Those already low in trust may be less responsive to such changes. Future research could explore these explanations by inclusion of qualitative evaluation, through within-subjects designs, reducing the effect of individual differences in propensity to trust across conditions, and through partitioning participants into high and low trusting groups using a pre-stimuli measure.

Given the modest relationship between trust and news use (Strömbäck et al., 2020), and the main reasons for declining use of news include it being "repetitive, confusing, and even depressing" (Newman et al., 2021, p.12), constructive news' impact on emotions may be more important for encouraging citizens' use of news than changes in trust. In previous studies participants have reported a preference for solutions or constructive stories, suggesting the approach may increase engagement (Baden et al., 2019; Hermans and Gyldensted, 2019; Hermans and Prins, 2020).

Additionally, the extent to which trust in news is desirable has been questioned, with suggestion a better outcome would be encouragement of healthy scepticism in place of unhelpful cynicism (Citrin and Stoker, 2018; Fisher, 2016).

Irrespective of such debates, constructive journalism's effect on trust bears further examination, including the extent to which various techniques increase or decrease trust, and in which domains. Additionally, the relationships between trust, mood, interest, and engagement would benefit from further study. Theoretically, constructive journalism appears promising for increasing trust, and solutions journalism has indicated some capacity for doing so (Thier et al., 2019). However, if constructive journalism is producing negative effects on trust, it is important to understand how and why this occurs, and the ramifications for practitioners and outlets.

Our results contribute to previous research finding complicated effects of constructive journalism (Kleemans et al., 2019; Meier, 2018). Constructive journalism presents an effective way for journalists to counteract the negative emotions engendered by news coverage, and our results suggest this effect to persist across an array of constructive journalism techniques. Use of such techniques may help to counter-act news avoidance and compassion fatigue, particularly as audiences reported feeling overloaded by negative news throughout the pandemic (Newman et al., 2021; Skovsgaard and Andersen, 2020). However, journalists should be aware this may come with a trade-off for audience's recall of specific facts and details. As a key aim of constructive journalism is to report accurately and in a socially responsible way (Bro, 2019), consideration of the aims of a particular story should guide the use and placement of constructive journalism techniques to ensure they enhance rather than impede reporting's impact. Further research on the effect of information processing and outcomes such as trust, problem awareness, and behaviours in the context of specific techniques and their combination would assist in guiding the approach.

4.1 Limitations and future research

While our study builds on previous studies of constructive journalism by including a broader range of techniques, future investigation of co-creation, not included in our stimuli, would be beneficial; particularly as a more relational approach may increase trust (Zand, 2016). Relatedly, our design tested constructive journalism as an overall approach, conceptualised through six techniques. While this matches the suggested approach, using a mix of constructive journalism techniques depending on the article context (Gyldensted, 2015; Hermans & Drok, 2018), we cannot parse the

effect of individual techniques. Such parsing could be included in future research, to provide specific insight on the effect of single techniques on outcome variables, such as trust.

While many studies of constructive journalism have used stimuli with minor changes, such as a sentence or paragraph presenting a solution, between conditions, we aimed to produce stimuli with higher fidelity and ecological validity. The articles in both conditions shared the same initial material, underwent a systematic process to produce the stimuli, and were checked by expert and lay reviewers. Nevertheless, articles were subject to greater variation between conditions, which may have reduced a degree of internal validity, though increasing external validity. Similarly, topics and outlet may have influenced results (see McIntyre, 2019, on solutions journalism), though our use of multiple articles suggests the effects to be robust.

As previously discussed, our choice of measures may have influenced the results for comprehension and trust. Future research could employ broader measures of comprehension to investigate whether constructive approaches have a varying influence across different domains of comprehension, and similarly include measures of trust in the author/outlet. Longitudinal and mixed-methods research would also assist in understanding effects on trust, which is unlikely to be strongly moved in the duration of an experiment.

While previous constructive journalism research has primarily been conducted with European or United States participants, we recruited Australian participants. As media norms differ within countries and regions, our results may be influenced by the sample's nationality. Cross-national research could examine whether responses to constructive journalism, particularly on trust which may be more context-dependent, vary across nationalities and demographics.

As an important role of the news is to convey information, and such a role relies to some extent on trust from the audience, our findings merit further investigation to better understand the consequences, negative and positive, in the use of constructive journalism approaches.

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