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 (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." 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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