



Educating and Measuring News Literacy and Civic Engagement in 9- to 11-year-olds

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1 Executive Summary

Introduction

A well-informed citizenry that can evaluate the validity of news is a sign of a healthy democracy. Such an ability requires media consumers to be *news literate* – that is, to possess the skills, knowledge and attitudes required to engage with the news, to evaluate news stories and understand the broader news ecosystem.¹ Research shows that many children, especially those from socio-economically disadvantaged backgrounds, lack basic news literacy skills and knowledge. Furthermore, as stated by Ofcom,² there is a lack of effective measures and knowledge of what, and the extent to which, media and news literacy educational initiatives are effective.

The aim of the *NewsWise in Primary Education* project was to address these gaps and understand how news literacy could be effectively educated and measured. The research also provided an opportunity to collect and analyse data pertaining to young people’s attitudes of news literacy and civic engagement and as well as to establish, for the first time, if there is a relationship between them.

Designed by The Guardian Foundation in partnership with the National Literacy Trust and the PSHE Association, the NewsWise programme was developed with a view to cultivating news literacy in school children aged 9-11 in the UK.

Methods

The study adopted a mixed methodology based on the use of both quantitative and qualitative methods chosen to answer the following four research questions:

RQ1: How can news literacy and civic engagement be measured in 9–11-year-olds?

RQ2: What are 9-11-year-olds’ self-reported levels of news literacy and civic engagement?

RQ3: Does the NewsWise programme improve the news literacy and/or civic engagement of 9-11-year-olds?

RQ4: What is the relationship between news literacy and civic engagement among 9-11 year olds?

1972 participants from 40 schools, participated in the research. The participants were drawn from a broadly representative sample from all four UK nations and attended schools with high levels of pupils on free school meals. Twenty schools were randomly selected to receive

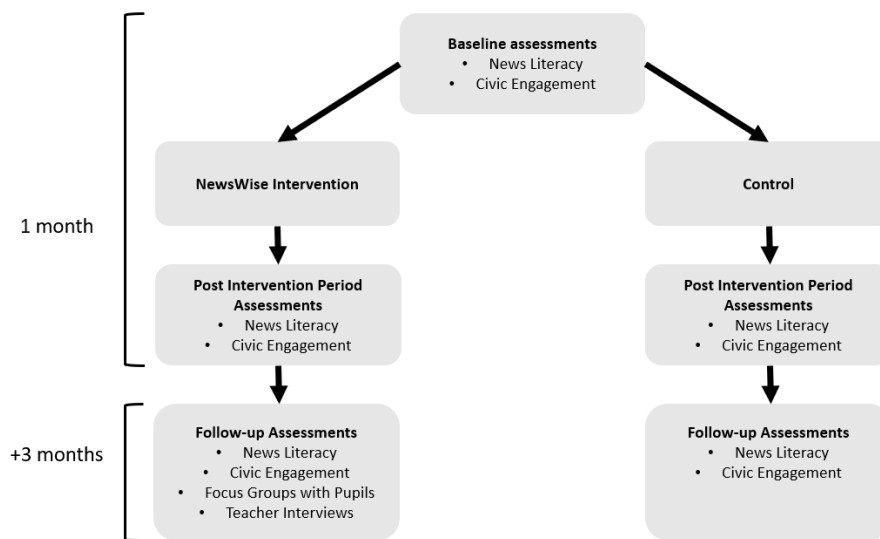
¹ References adapted from Tully, M., Maksl, A., Ashley, S., Vraga, E. K., & Craft, S. (2022). Defining and conceptualizing news literacy. *Journalism*, 23(8), 1589-1606. <https://doi.org/10.1177/14648849211005888>

² Ofcom (2023). Children and parents: Media use and attitudes. https://www.ofcom.org.uk/_data/assets/pdf_file/0027/255852/childrens-media-use-and-attitudes-report-2023.pdf

the NewsWise intervention, and 20 schools selected to receive no intervention, proceeding with their regular curriculum instead. Teachers of pupils in the intervention group were trained to deliver a series of 15 hour-long lessons. Delivery varied school to school - some schools delivered the intervention every day, one lesson per day, for three weeks, others took longer to deliver the intervention, depending on their school timetable. Schools typically took between three and five weeks to deliver the full intervention.

The NewsWise programme was designed to encourage them to engage with the news, to learn about the difference between facts and opinions, to understand the meaning of terms such as bias and “fake news”, to learn about different strategies to identify misinformation, to learn about the processes of consumption and production that are inherent in the news industry, and to write a news report.

Various aspects of news literacy and civic engagement as outcome measures were assessed at three time points: immediately before the intervention period, one month later after the intervention period, and three months after that as a follow-up to test for maintenance of any treatment effects. Additionally, focus groups were conducted with pupils who participated in the NewsWise intervention condition, as well as one-to-one interviews with teachers who participated in delivering the NewsWise intervention.



Findings

A summary of the main findings for each of the four research questions is provided below.

Finding 1: A new validated set of news literacy measures, suitable for 9- to 11-year-olds, was created.

Existing news literacy measures were adapted to create a new framework and set of associated measures suitable for 9–11-year-olds as none previously existed. The new measures, which were first designed, piloted and then revised, sought to measure the following three dimensions of news literacy and five associated constructs:

Dimension of News Literacy	Related Constructs
Dimension 1: Attitudes towards news reporting and trustworthiness Definition: An appreciation of the importance of news reporting in terms of quality and trustworthiness.	Construct 1A: News motivation Definition: the motivation required to engage with the news.
	Construct 1B: News attitudes Definition: Beliefs that news should be balanced, honest, fair, and useful.
Dimension 2: knowledge of news production and consumption Definition: An understanding of the processes of news production and consumption inherent in the news industry, and of the role of audiences.	Construct 2: News knowledge Definition: An understanding of the processes of news production and consumption inherent in the news industry, and of the role of audiences.
Dimension 3: Evaluation skills and strategies Definition: The ability to deploy different strategies to evaluate the trustworthiness of information and news stories.	Construct 3A: News evaluation self-report Definition: The self-reported ability to evaluate the trustworthiness of news stories.
	Construct 3B: News vigilance Definition: The self-reported actions taken if/when confronted with misinformation.

In addition to the above, we also developed a twelve-item objective test of 9-11-year-olds' ability to correctly detect fake news stories.

The five sub-constructs loading onto three higher-order dimensions were all found to be theoretically, methodologically and empirically valid for use with 9–11-year-olds in the present and future studies.

Finding 2: A new validated set of civic engagement measures, suitable for use with 9–11-year-olds, was created.

As no measure for civic engagement suitable for younger children was available, a new measure was created. The new measure for civic engagement consists of the following three constructs:

Construct	Definition
Awareness	Awareness of the issues that pertain to the socio-political context.
Attitudes	Positive attitudes towards community and political life and towards one's own rights and responsibilities as a citizen.
Action	Participation in community and political activities in the present time.

All three constructs were found to have good psychometric properties and suitable for use in the present and future studies seeking to measure civic engagement in 9-11-year-olds.³

Finding 3: 9–11-year-olds in the UK believe the news should be truthful and balanced, but less than half know how to spot fake news and only three in ten are interested in the news.

Baseline data from the control and experimental participants was used to analyse the attitudes of 9- to 11-year-olds towards the news.⁴ Notable findings from this analysis include that 9- to 11-year-olds (all % are strongly agree or agree):

- Believe that news stories should be truthful (86%).
- Believe that fake news is bad (84%).
- Believe that news stories should be balanced (81%).
- Believe it is difficult to tell if information online is trustworthy (62%).
- Stop and check facts before believing the news (59%).
- Can name trustworthy places to find news (52%).
- Find it is easy to tell if a news story is real (52%).
- Know how to spot “fake news” (47%).
- Often read, watch or listen to the news (42%).
- Are interested in the news (35%).
- Read a newspaper to stay informed about the news (19%).

Finding 4: 9–11-year-olds in the UK have extremely positive attitudes towards civic engagement. Five in ten, however, think that they will vote when they grow up, and only 35% talk about politics and social issues with their parents.

Baseline data from the control and experimental groups was used to analyse the participants’ attitudes towards civic engagement.⁵ Notable findings from this analysis include that 9–11-year-olds believe:

- It is important to support charities (90% strongly agree or agree).
- It is important to know what is happening in the world (90% strongly agree or agree).
- That they want to be the sort of person who helps others whenever they can (88% strongly agree or agree).
- That helping others makes them feel good (88% strongly agree or agree).
- That adults should vote in elections (68% strongly agree or agree).
- When they grow up, they will regularly volunteer their time for good causes (61% Strongly agree or agree).
- Adults should take part in peaceful protests (57% Strongly agree or agree).
- When they grow up, they will vote in an election (49% extremely likely or likely).

³ See McLoughlin, S., Polizzi, G., Harrison, T., Moller, F., Maile, A., Picton, I., & Clark, C. (2023). Measuring Civic Engagement in Young Children. *Journal of Psychoeducational Assessment*, 07342829231205070. <https://doi.org/10.1177/07342829231205070>

⁴ It should be noted that the sample was broadly representative geographically but skewed towards schools with high free school meals.

⁵ It should be noted that the sample was broadly representative geographically but skewed towards schools with high free school meals

Finding 5: The NewsWise programme improved 9-11-year-olds' ability to detect fake news and this improvement sustained over time.

Results from the trial found that the programme improved participants' ability to detect fake news and this difference sustained to the follow-up period. This finding is particularly significant as it was based on the only performance-based, rather than self-report, measure used in the study.

The NewsWise programme was found to have not made a significant difference to the other areas of news literacy and civic engagement that were measured. The analysis revealed considerably different results at a school level, suggesting the programme was likely to have had a higher impact in some schools than others, which requires further exploration.

Finding 6: Qualitative analysis found many benefits of the NewsWise programme as well as areas for improvement.

Three overarching themes emerged from the analysis of the qualitative data. These themes suggest that the programme: (i) potentially presents multiple benefits in terms of developing pupils' news literacy; (ii) has the potential to develop pupils' civic engagement through their engagement with news; and, (iii) was well received by both pupils and teachers and could be improved for future delivery.

Finding 7: A strong positive relationship between news literacy and civic engagement among 9-11-year-olds was found for the first time.

The study found a strong relationship in 9- to 11-year-olds' news literacy and their civic engagement. This means that news literacy levels can be used to predict civic engagement and *vice versa*. This is the first study to test for and discover a link between news literacy and civic engagement in 9–11-year-olds.

Implications and Recommendations

The findings from the study have significant implications that are relevant to researchers, educators and policymakers interested in improving news literacy and civic engagement education. This is pertinent given the need for engaging and effective media/news literacy education in the 21st century, where there is potential for even greater spread of bias and mis- and disinformation, which may be exacerbated through the rise of generative AI and other emerging technologies.

Below is an overview of the four key overarching findings that relate to the research questions of this project, along with their implications and our recommendations for policy-makers, researchers and practitioners.

1: A new set of validated instruments for measuring news literacy and civic engagement in 9-11-year-olds were created and can be used for future population monitoring or evaluation of interventions. The instruments, which were designed, piloted and tested prior to conducting this study, were found to have good psychometric properties.

- **Implications:** These instruments, the first of their kind, are suitable for use in further studies seeking to measure the news literacy and/or civic engagement of 9-11-year-olds. As such, they may be used by future researchers – as well as a range of stakeholders including policymakers, educators and civic society practitioners – seeking to capture levels of news literacy and/or civic engagement among children aged 9-11 within the broader population in the UK and/or in other English-speaking countries. Relatedly, the instruments may be used as part of the evaluations of future educational interventions aimed at improving 9-11-year-olds’ levels of news literacy and/or civic engagement.
- **Recommendations:** Future research should focus on using these newly validated instruments to conduct longitudinal studies that track changes in news literacy and civic engagement in 9-11-year-olds over time. This will provide valuable insights into how news literacy and civic engagement develop and evolve as children grow, and how they are influenced by various factors such as societal changes brought about by policy and new technologies, educational interventions and socio-economic background. Additionally, policymakers and educators should consider integrating these instruments into regular educational assessments and curricula to monitor and enhance news literacy and civic engagement from an early age. This integration can also help in tailoring educational content and teaching methods to foster news literacy and civic engagement more effectively in young learners, which is important in an era of rapid technological transformation including news written through generative AI. Furthermore, these instruments can be adapted and tested in diverse cultural contexts to understand cross-cultural similarities and differences in news literacy and civic engagement among children.

2: Data from this study represents a reliable baseline of 9-11-year-olds’ self-reported levels of news literacy and civic engagement to measure future change.

- **Implications:** This baseline measurement was the first to simultaneously assess news literacy and civic engagement levels of young children aged 9-11 in the UK. As such, it shows the dimensions of 9-11-year-olds’ news literacy that are less developed, including their ability to spot fake news and interest in the news. The baseline dataset highlights areas that require more attention when designing future interventions aimed at developing different aspects of news literacy, including news engagement, vigilance about fake news, and the ability to correctly identify fake news. In addition, it has the potential to enable future research to produce longitudinal comparisons over the years, or comparisons with adjacent datasets such as those produced by Ofcom.
- **Recommendation:** National surveys of news literacy and civic engagement should be repeated annually to track trends over time. The benchmark data from this study may be used by future comparative studies with the aim at informing priorities for educating news literacy and for developing civic engagement in young children.

3: NewsWise appears to help young children detect “fake news”, but school engagement remains a challenge given competing curricular demands.

- **Implications:** This project’s findings about the effectiveness of NewsWise, and about the aspects of this programme that worked best or might need improving, can be used when designing new, and/or making revisions to, current news literacy programmes. Drawing on this study, researchers and practitioners designing new programmes should take into account that, as found by this study, NewsWise was particularly effective in developing children’s interest in the news and in spotting misinformation. At the same time, they should also keep in mind that the programme would benefit, as reported by teachers, from revisions aimed at producing a more condensed version with more differentiation in terms of resources and the delivery of these to pupils with different needs. The analysis revealed considerable difference in results at a school level, which suggests a variation in the quality of delivery and teacher/ pupil engagement. The reasons why the programme was more successful in some schools than others requires further investigation, and findings should be interpreted with some caution due to levels of attrition in this study.
- **Recommendations:** researchers, educators and civil society practitioners, both in the UK and elsewhere, could use the NewsWise programme to develop primary school children’s news literacy or take inspiration from this study with a view to designing new and/or revising existing news literacy programmes to maximise their effectiveness. It is recommended that primary schools teach key stage 2 pupils about “fake news” and how to recognise it using the learning approaches adopted by the NewsWise programme. These include teaching pupils about the difference between facts and opinions and about the different strategies that may be undertaken to spot misinformation. Furthermore, it is important that funders and researchers recognise and value evidence for what does not work, as well as what does work. This extends beyond what might work as an intervention towards also recognising practical barriers including schools’ competing curricular priorities and children’s general disinterest in the news.

4: News literacy is positively related to civic engagement, and so future intervention efforts should consider how both might be developed in tandem to reinforce each other.

- **Implications:** Findings from this project can usefully inform the design of future news literacy programmes aiming to develop not only primary pupils’ news literacy but also their civic engagement. This study found strong correlations between all dimensions of news literacy and of civic engagement among 9-11-year-olds, including, for example, between (i) their awareness of socio-political issues and motivation to follow the news, (ii) such awareness and their self-reported ability to evaluate news stories, and (iii) their participation in civic life (e.g., through community involvement) and interest in the news. As such, these findings can guide both the development and evaluation of future educational interventions by shedding light on what elements of news literacy are likely to correspond to different dimensions of civic engagement in 9-11-year-olds. This adds weight to those calling for increased news literacy education in schools, suggesting that this might have wider implications for society in general.

- **Recommendation:** The design and evaluation of future news literacy interventions for 9–11-year-olds should be developed in ways that are grounded in the recognition that there is a positive relationship between their development, and especially between certain dimensions of their news literacy and their civic engagement. Relatedly, we recommend that future research and interventions seeking to develop children’s civic engagement could consider their development of news literacy as a crucial aspect of such interventions.

2 Background

2.1 Objectives of the Research

Engagement with news is crucial to keeping abreast of current events and socio-political issues and, relatedly, to the functioning of democracy (Held, 2006). However, we live in an age that is highly mediated by digital technologies, which present not just opportunities (e.g., for socialisation, employment, and participation) but also risks. These include, to name a few, issues of privacy, online abuse and, when it comes to the authenticity of the information environment that digital technologies have contributed to shape misinformation (i.e., false or inaccurate information) and disinformation (i.e., false information intended to mislead; Livingstone et al., 2017).

While mis- and dis-information have existed for a long time, the internet amplifies both the extent to and the speed at which inaccurate or deliberately misleading information may be produced and shared (Vaidhyanathan, 2018). It follows that, in the digital age, news literacy – broadly understood as the skills, knowledge and attitudes necessary to evaluate news stories and understand the broader news ecosystem (Tully et al., 2022) – is an essential requirement for citizens to possess in order to engage with news both safely and critically. As such, news literacy intersects with what is commonly referred to as (critical) digital literacy – a variant of media literacy that refers to the ability to evaluate online content and understand the broader digital environment (Polizzi, 2020).

Growing research (e.g., Ashley et al. 2017; Martens & Hobbs, 2015) shows that school interventions based on delivering news and media or digital literacy programmes contribute to pupils' ability to evaluate information and, in turn, to their civic engagement, understood as involvement, and/or the intention to participate, in community and/or political life. Building on this research, this project undertook an evaluation of the NewsWise in Primary Education programme. NewsWise is a UNESCO-awarded UK cross-curricular news literacy programme for 9-11-year-olds run by the Guardian Foundation since 2018. The main strand of this research involved conducting a randomised clustered controlled trial supported by interviews with teachers and focus groups with pupils in order to evaluate which features of the programme increase 9-11-year-olds' news literacy. This study also sought to develop and validate new sets of measures for news literacy and civic engagement suitable for 9-11-year-olds, explore 9-11-year-olds' levels of news literacy and civic engagement, and examine if there is a relationship between such levels across the different dimensions of news literacy and civic engagement. The overall aims of this research were to make a contribution to supporting the next generation of children to be better equipped to participate in society as well-informed citizens.

2.2 Importance for Policy and Practice

Civic engagement (i.e., participation in community and/or political life) is crucial to the functioning of democracy. While young people are less engaged in traditional forms of politics than adults, in the digital age they often participate in different ways, from sharing public life

on social media to joining online communities where they express their views on issues such as the environment or migration (Jenkins et al., 2016). A key challenge to their civic engagement is the “high prevalence of false news and misinformation”, especially online (Cho et al., 2020, p. 3). Problematically, children often lack the critical skills to assess the reliability of information. We know from Ofcom (2023) that three in ten children aged 8-17 in the UK believe “all or most of what they see on social media to be true” and are often overconfident about their ability to identify fake content online (p. 3).

Previous research findings show that children need news and digital literacy as they increasingly consume online information alone, which can exacerbate their vulnerability and affect their trust in evidence and authority. The ability to autonomously and critically evaluate information found online is crucial to addressing local, national and international concerns including current and future pandemics, global warming and conflict.

More rigorous evaluation of news and media or digital literacy interventions has been widely called for. For example, the Online Media Literacy Strategy published by the Department for Digital, Culture, Media and Sport (DCMS) on the 14th July 2021 states that a primary challenge is the “lack of sound evaluation data about which media initiatives are effective” (DCMS, 2021). The rapid evidence assessment carried out by the LSE (Edwards et al., 2021) also calls for more evidence about “what works” in media literacy education. This is further complicated because media or digital literacy education is not firmly embedded in the school curriculum (Polizzi & Taylor, 2019). In addition, recent research commissioned by the Department for Science, Innovation and Technology (DSIT) has found that the work of civil society organisations designing and delivering media literacy and similar interventions is hindered by limited funding (Edwards et al., 2023).

The results of the current research are designed to help improve the NewsWise programme and support the case for media literacy to be incorporated more widely into the primary school curriculum, as well as providing evidence about what works in terms of news and media or digital literacy education. The secondary aim of this study, which was to establish if there is a link between news literacy and civic engagement among 9-11-year-olds, is also important. To address misinformation and associated concerns, we need children and young people who do not just know about the issue, but also take positive action in the interests of themselves and others (see McDougall & Rega, 2022). Therefore, findings from the trial will provide evidence for those considering if media and news literacy education should feature more prominently in the school curriculum. Similarly, the findings should be beneficial to generations of children who will increasingly need finely tuned media, news and digital literacy skills to participate in society.

2.3 Children and News Literacy

When it comes to news literacy research, there is a dearth of both valid measures and research focusing on young children, with most studies evaluating news and media literacy programmes for secondary school pupils in countries outside the UK, including primarily the United States (e.g., Ashley et al. 2017; Martens & Hobbs, 2015). A handful of studies have designed and validated scales that, focusing on adolescents, prioritise certain dimensions of

news literacy including, primarily, knowledge of the news industry (e.g., Ashley et al., 2013; Vraga et al., 2015) and, to a lesser extent, an appreciation of the importance of the news, and news media scepticism (e.g., Maksl et al., 2015). As such, these scales have aimed to capture knowledge of news production and consumption processes (with items including, for example, “news is designed to attract an audiences’ attention” – Ashley et al., 2013, p. 13), motivations to engage with the news, and whether news stories are perceived to be accurate and trustworthy (Maksl et al., 2015, p. 41). By contrast, some research has placed more emphasis on the extent to which adolescents are able to evaluate the validity of news stories and information more broadly. Within this area, however, studies have generally used instruments that were not validated beforehand and measured such an ability by relying primarily on self-reporting (e.g., Alt & Raichel, 2020; Hobbs & Frost, 2003; Jones-Jang, 2021), with only a few studies using performance tasks asking participants to identify accurate and reliable information including social media posts and news articles (e.g., Cole et al., 2022; Pennycook & Rand, 2018).

Two limitations largely apply to this body of work: i) the limited use of validated scales casts doubts on the overall validity and reliability of the instruments that were used by these studies, ii) self-reporting instruments are not ideal for measuring skills, since they may well conceal issues of over-confidence and therefore discrepancies between participants’ reported and actual competences (Helsper et al., 2020). Despite these limitations, however, some research has offered promising insights into the effectiveness of school programmes in developing adolescents’ news and media literacy. Recent research has shown that these types of programmes increase young people’s knowledge of the news industry and ability to analyse news stories (e.g., Ashley et al. 2017). What is more, a few studies have found that pupils’ participation in these programmes corresponds to an increase in their knowledge of current events, intention to participate in civic life, exposure to and sharing of different political perspectives, and internal political efficacy (i.e., one’s belief in their ability to participate in political life), thus establishing a positive relationship between news literacy and civic engagement (Ashley et al., 2017; Kahne et al, 2012; Kahne & Bowyer, 2019; Martens & Hobbs, 2015). But what is the state of research into how civic engagement may be conceptualised, operationalised and measured among children?

2.4 Children and Civic Engagement

Civic engagement includes not only conventional forms of political participation such as voting and reading about socio-political issues but also participation in non-institutional politics (e.g., taking part in demonstrations), community involvement and service, and the sharing of public life (volunteering or posting online information about politics; Dahlgren, 2013). In addition, whilst the concept of political participation traditionally refers to the undertaking of activities that aim to influence decision-making processes, the notion of civic engagement includes these activities along with a psychological dimension referring to the motivations and values underpinning how citizens participate in society (Dahlgren, 2003, 2013). As such, civic engagement is here understood as community involvement, acts of service and political participation that is appropriate to children’s age (Arthur et al., 2017;

Moley et al. 2002, Torney-Purta, 2006). But how can it be operationalised in practice to measure the civic engagement of children?

Many instruments have been developed to measure the civic engagement of adult populations (e.g., Doolittle & Faul, 2013). However, the question of how to measure the civic engagement of children remains under-researched. A few studies have focused on teenagers and adolescents (e.g., Flanagan et al., 2007; Schulz et al., 2022). Nevertheless, there is a dearth of research investigating how younger children engage in civic life, what may be expected of their engagement given their age, and what instruments may be used to measure their civic engagement. In short, the empirical literature on how children, and especially younger children, take part in civic life is both limited and hindered by a lack of reliable measures. Most studies have focused on older children and young people over the age of 12 (e.g., Flanagan et al., 2007), 14 (e.g., Schulz et al., 2022) and 16 (e.g., Arthur et al., 2017; Cohen & Chafee, 2013; Doolittle & Faul, 2013; Wallrich et al., 2021). Conducted in different countries including the US, Germany, and the UK, these studies have operationalised civic engagement as including different dimensions, with some focusing predominantly on community service and involvement – e.g., donating to a charity, volunteering (e.g., Arthur et al., 2017, Doolittle & Faul, 2013; Moley et al., 2002, Toncar et al., 2006) – and others incorporating elements of political participation both in the present time – e.g., discussing politics with friends and family – and in the future – e.g., a willingness to vote after reaching the age of majority (e.g., Flanagan et al., 2007; Schulz et al., 2022).

One notable exception that has measured the civic engagement of young children under the age of 12 is a study conducted by Nicotera (2008). This study evaluated the impact of a school programme delivered in the US with a view to developing the civic engagement of children aged 5-13. Nicotera found that the programme increased children's levels of civic engagement. In her study, however, civic engagement was operationalised as including only community involvement, with little attention to children's attitudes towards or involvement in political life. It is important to recognise that young children do not have the same opportunities as young adults aged 18 and above in terms of their participation in political life. Nevertheless, instruments should arguably incorporate elements of political participation that, as covered by studies focusing on older children, may range from understanding and discussing socio-political issues to cultivating a desire to vote in the future.

2.5 News literacy and Civic Engagement

It is fair to argue that engagement with news, which is crucial to news literacy, is an integral part of civic engagement, particularly in terms of keeping abreast of current events and the issues that pertain to the socio-political context. As such, one could argue that there may be a relationship between the development of news literacy and civic engagement. However, what this relationship may look like, which is an empirical question, is still unclear and evidenced by limited research that is still in its infancy.

As reviewed above, a few studies in the US have found that young people's participation in news and media literacy programmes contributes to their knowledge of current events, intention to be civically involved, exposure and sharing of different political views, and perceived ability to participate in political life, thus showing a positive relationship between news literacy and civic engagement (Ashley et al., 2017; Kahne et al, 2012; Kahne & Bowyer, 2019; Martens & Hobbs, 2015). While this body of work is embryonic and has focused on older pupils in the US, the question of whether, and to what extent, such a positive relationship exists in the context of how primary school pupils develop news literacy through formal education remains unexplored. This study aimed to do just that: to evaluate not just the effectiveness of NewsWise in developing primary school pupils' news literacy in the UK, but also whether, and to what extent, their development of news literacy corresponds to an increase in their civic engagement.

2.6 The NewsWise in Primary Education Programme

Designed and delivered by The Guardian Foundation in partnership with The National Literacy Trust and PSHE Association, NewsWise is a UNESCO-awarded UK cross-curricular news literacy programme for 9-11-year-olds that has been running since 2018. This programme is a prominent and freely available UK-wide news literacy programme for 9-11-year-olds. NewsWise brings together experts in news and digital literacy, journalism and PSHE education to deliver resources and activities designed to enlighten children about how news – including fake news – is created and disseminated, enabling them to deconstruct and analyse news stories, and spot bias and misinformation. Targeting schools with above average Free School Meal (FSM) level, as well as English literacy “cold spots”, the programme aims to reach every corner of the UK, and since March 2018 has reached over 14,500 children, over 3,000 teachers and worked with 66 journalist volunteers.

The NewsWise programme is outlined in some detail in section 3.3. However, to provide a brief overview: NewsWise includes resources, lesson plans and classroom activities (The Guardian Foundation, 2023) designed to encourage children to engage with the news, to appreciate the difference between facts and opinions, to understand terms such as bias and “fake news”, to learn about different strategies to spot misinformation, to learn about the consumption and production processes that are inherent in the news industry, and to write a news report. The first iteration of NewsWise (see Cole et al., 2022) was evaluated by the National Literacy Trust using an approach designed primarily to capture changes in children's news literacy attitudes, behaviours, confidence and skills. Measures against each of these outcomes, which included a performance test to assess pupils' ability to spot misinformation, showed promising results. Based on a mixed methods approach, the National Literacy Trust found that more than twice the percentage of pupils reported they would check whether a news story came from a news company or person they trusted at the end of the programme (34.0% vs 72.2%). Furthermore, the percentage of pupils who were able to correctly identify whether two out of three news stories were fake or real increased from 49.2% to 68.0% (Cole et al., 2022).

This project built on the promising evaluation by the National Literacy Trust in the following ways: it was conducted by an independent academic team; focused on establishing if there is a relationship between news literacy and civic engagement among 9-11-year-olds; and utilised more sophisticated and rigorous statistical testing (a randomised controlled trial along with other measures).

2.7 Research Questions

Building on the previous evaluation of NewsWise, this project aimed to evaluate the second iteration of the programme by focusing not just on the question of whether the programme improves pupils' news literacy skills but also on the question of whether such an improvement corresponds to an increase in their civic engagement. Furthermore, the project offered an opportunity to develop and validate a new set of news literacy and civic engagement measures suitable for 9-11-year-olds and understand 9-11-year-olds' baseline self-reported levels of news literacy and civic engagement. With this in mind, this project addressed the following four research questions:

RQ1: How can news literacy and civic engagement be measured in 9–11-year-olds?

RQ2: What are 9-11-year-olds' self-reported levels of news literacy and civic engagement?

RQ3: Does the NewsWise programme improve the news literacy and/or civic engagement of 9-11-year-olds?

RQ4: What is the relationship between news literacy and civic engagement among 9-11-year-olds?

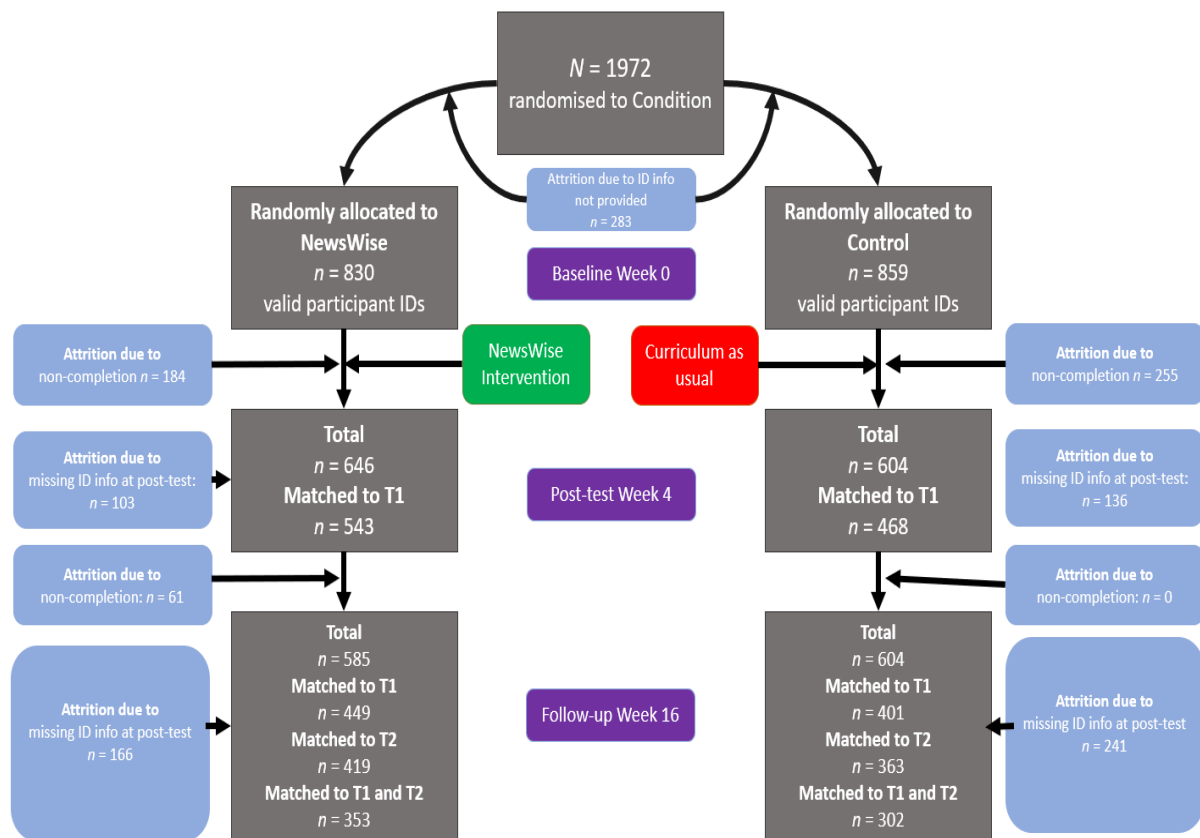
3 Methodology

3.1 Participants

Forty UK schools were recruited to take part in this study ($N = 1972$ children). Schools were randomly allocated to the experimental (i.e., NewsWise intervention; $n = 988$) or control group (curriculum as usual; $n = 984$) using the excel macro “= RANDBETWEEN (1,2)”, such that there were 20 schools per condition. Most participants were aged nine ($n = 664$), ten ($n = 1045$), or eleven ($n = 249$), with seven twelve-year-olds and the remainder ($n = 7$) unspecified. At the beginning of the study, 958 participants reported being male, 945 were female, 72 participants responded Other/Prefer not to say, and seven did not provide any response to the question asking about their gender. 1029 participants were in Year 5 (England, Wales, and Northern Ireland), 749 were in Year 6 (England, Wales, and Northern Ireland), 92 were in Year 7 (Northern Ireland), 29 were in P6 (Scotland), 66 were in P7 (Scotland), and seven responses were left blank. In the NewsWise condition, 33.28% of participants were eligible for Free School Meals, while in the Control condition it was 39.05%; both were well above the English national average of 22% from 2022.

Figure 1 is a CONSORT diagram for this study, outlining the participant numbers in this study at each stage. Raw numbers are included in the interest of transparency, and a fuller discussion of missing data can be found in section 3.5.5.1.

Figure 1. Consort diagram for the study



Schools were purposively recruited by the Guardian Foundation with a view to maximising heterogeneity in terms of proportional representation of the UK based on geographical location, helping to ensure inclusion of socio-economically disadvantaged areas, as represented by the Free School Meal (FSM) rate. A map of approximate school locations can be found in Figure 2 below.

Figure 2. Map of approximate locations for schools in the NewsWise trial.



A breakdown of where these schools were located by approximate region is found in Table 1 below

Table 1. Regional distribution of participating schools.

Location	No. of Schools Recruited	Target	Regional Proportion
Northwest England	6 (3 experimental, 3 control)	5	12%
Northeast England	2 (1 experimental, 1 control)	2	4%
Yorkshire	2 (1 experimental, 1 control)	3	8%
Southwest England	3 (2 experimental, 1 control)	4	9%
London	3 (2 experimental, 1 control)	3	8%
West Midlands	4 (1 experimental, 3 control)	3	8%
East Midlands	3 (2 experimental, 1 control)	3	8%
Southeast England	5 (3 experimental, 2 control)	5	12%
East of England	4 (2 experimental, 2 control)	4	9%
Northern Ireland	2 (1 experimental, 2 control)	2	4%
Scotland	3 (1 experimental, 2 control)	4	10%
Wales	3 (1 experimental, 2 control)	3	7%

A subset of these schools also took part in interviews (for teachers) and focus groups (children). The approximate locations for these can be found in Table 2 below.

Table 2 *Overview of the schools that took part in the qualitative evaluation of NewsWise*

School	Location	No. of focus groups with children	No. of interviews with teachers
A	Northwest England	2	1
B	Yorkshire, England	2	1
C	London	4	2
D	London	2	3
E	Northwest England	2	2
F	Northern Ireland	2	1
G	Southeast England	1	1
H	Scotland	1	1

3.2 Design

3.2.1 Quantitative

The design of this study was a mixed between/within cluster randomised controlled trial design. This means that there were multiple schools that were randomised to one condition or another, with one group of schools receiving the intervention and the other group of schools not receiving it. Within each school, the same pupils completed multiple assessments on different occasions. In this study, more specifically, there were two independent conditions: the NewsWise intervention group, and the inactive control group. There were three measurement time points: (i) immediately prior to the intervention period, (ii) one month later immediately following the intervention period, and (iii) three months after the intervention period ended. In accordance with the trial protocol, there were two random factors to be controlled for during the analysis using hierarchical linear modelling: School and Participant.

3.2.2 Qualitative

There were two qualitative components to this study. First, participants who completed the NewsWise intervention were asked about their views and experiences of the intervention within focus groups. Each focus group was made up of approximately 7-8 students at a time, and focus groups were conducted at their schools. Additionally, one-to-one interviews with teachers who delivered the intervention were conducted. The questions for these semi-structured focus groups and interviews are specified within the Materials section below.

3.3 Intervention

NewsWise is an educational programme designed to enhance news literacy among primary school students. Developed collaboratively by experts from The Guardian Foundation, National Literacy Trust, and PSHE Association, the programme integrates news literacy with primary English and Personal, Social, Health and Economic (PSHE) education. It provides a variety of resources, including free lesson plans, workshops, and teacher training, along with opportunities for students to interact with professional journalists. See 3.5.1 For a fuller description of the intervention.

3.3.1 Eligibility and Accessibility

The full NewsWise package, which encompasses workshops and other resources, is primarily targeted at primary schools where the rate of free school meal eligibility exceeds the national average, underscoring its commitment to educational equity. This package is offered at no cost to qualifying schools.

3.3.2 Curricular Focus and Learning Journey

The NewsWise programme is structured as a comprehensive unit of work that fosters engagement with news media and develops critical news literacy skills essential for the modern information landscape. The curriculum is designed to take students through a “Journalist Training School”, allowing them to experience authentic journalistic skills. This culminates in the production of their own news report, marking the completion of the programme.

The learning journey of NewsWise is categorised into 15 distinct steps (see <https://theguardianfoundation.org/programmes/newswise/schools/unit-of-work>), focusing on three broad aims:

1. **Engagement and Understanding of News Production (Steps 1-4):** This phase aims to immerse pupils in the world of news, helping them understand its purpose and the processes involved in its creation. It emphasises the importance of news in challenging power structures.
2. **Critical Navigation of News (Steps 5-9):** Pupils learn to critically assess news content, distinguishing between fact and opinion, recognising biased language, and understanding the implications of “fake news”. This stage is deemed crucial for developing discerning news consumers who can evaluate the balance and fairness of news reports.
3. **Empowerment in Reporting (Steps 10-15):** The final phase empowers students to become news creators. They learn to identify and plan real news stories, understand the structure of news reports, and use appropriate language. This section culminates in the drafting, editing, redrafting, and publication of their own news report, complete with standard news page features.

NewsWise stands as a potentially important programme in fostering news literacy among primary school children. By engaging, enabling, and empowering young pupils, it was hypothesised that it would equip them with the critical skills needed to navigate, understand, and participate in the modern news ecosystem. Through its comprehensive approach, NewsWise has the potential to contribute significantly to the development of informed, critical, and active participants in civic society.

3.4 Materials

3.4.1 Quantitative Measures

Quantitative measures (specified below) were given to all participants at each of the three time points, save the Reflective Questions which were only given to the intervention group. Likewise, only those in the intervention group were eligible for the qualitative focus groups and interviews.

News Literacy

The main measures are summarised below. In some cases, validated measures were used, while in others additional single-item measures drawn from previous literature were used. The measures we drew upon for this during piloting are cited within Appendix 4 of the trial protocol: <https://jubileecentstg.wpengine.com/wp-content/uploads/2023/08/Final-NewsWise-Trial-Protocol-5th-Sept-22.pdf>

Self-reports

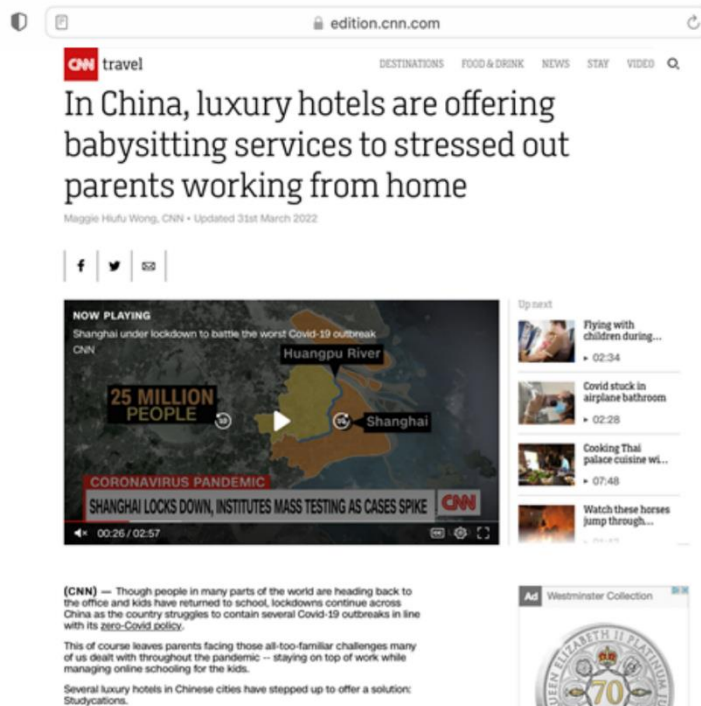
At the outset of this study, there were no measures of news literacy that were validated for the age groups in question. Therefore, existing measures that were used with older children were adapted to use language that we thought would be relevant and accessible for children in our study. Participants responded to these items in a series of Likert scales. A pilot study ($N = 655$) was used to determine which of this broader set of questions should be retained. The research team conferred with members of the National Literacy Trust about which questions should be retained based on a careful consideration of floor and ceiling effects, as well as the frequency of “I don’t know” and “I do not understand the question” responses. The final list of items to be answered on a series of Likert scales (see Appendix A) covered a range of topics such as knowledge about the news, self-reported news literacy, beliefs about the moral status of news media, and scepticism and vigilance towards the news.

Objective tests

To supplement the self-report measures, a twelve-item test (created by the research team in consultation with members of the advisory board; see Figure 3 for an example item) of the ability to recognise “fake news” successfully was used (hereinafter, the “Detecting Fake News” test). These items involved the participants being presented with a series of twelve online news items. They were then asked the following question about each news item: “Based on the information provided in the news clip above, I think that this article is...” with the responses, “Real”, “Fake”, or “Not enough information to decide”. For each of these possible

answers, one of them was considered to be correct. “Real” was considered to be correct for news stories that were not altered from their original version. “Fake” news stories were determined in various ways including (i) if the picture for or some of the text in the news story bore no relationship to the headline, (ii) if the headline made no sense, (iii) or if the URL was wrong. “Not enough information to decide” was considered correct when (i) the URL was missing or (ii) when the author was missing. Correct answers (1 = correct, 0 = incorrect) were averaged such that mean scores varied between 0 and 1.

Figure 3. Example “Detecting Fake News” item.



Based on the information provided in the news clip above, I think that this article is...

- Real
- Fake
- Not enough information to decide

Civic Engagement

Validated self-reports

During the piloting phase for this project, a new measure of Civic Engagement for use with children aged 9-11 was developed and validated. Across ten self-report items, this scale measured Awareness (discussing/engagement with community issues), Attitudes (positive disposition towards civic engagement), and Actions (reports of actual civic engagement). This measure underwent peer review and was published in the Journal of Psychoeducational Assessment (McLoughlin et al., 2023). It shows excellent psychometric properties and is age-appropriate with a Flesch Reading Ease score of 70.70 and a Flesch–Kincaid Grade-Level of

5.90 suggesting that the items were easy to read for children aged approximately 10–11. This measure was deemed appropriate for this study given the low frequency of 9-year-olds in our sample.

Unvalidated self-reports

Some miscellaneous self-report questions around civic engagement were also included. Once again, these measures were derived from existing measures of civic engagement with older children (e.g., Arthur et al., 2017, Doolittle & Faul, 2013, Flanagan et al., 2007) and were only adapted for this age group during piloting. As these items were supplementary, they were analysed as separate outcomes.

Reflective Questions

At the end of the study, once the final assessment was complete, participants in the intervention condition were asked to reflect on what they learned. There were three main questions. The first was “What, if anything, do you remember learning when you took part in NewsWise?” and participants were free to provide their answers within an open text box. The second question concerned news literacy: “Which, if any, of the following have you been doing since taking part in NewsWise?”, followed by five statements: (i) “I am interested in the news”, (ii) “I have been reading, watching, or listening to the news”, (iii) “I have been checking if a news story is not fake”, (iv) “I have been talking about the news with my family”, and (v) “I have been talking about the news with friends”. The third and final question concerned civic engagement: “Which, if any, of the following have you been doing since taking part in NewsWise?”, followed by the following four statements: (i) “I have volunteered”, (ii) “I have helped people in the area where I live”, (iii) “I have contributed my time or money to charities”, and (iv) “I have spoken to people about causes I care about”. Participants responded to each statement by selecting “Less than before”, “About the same as before”, or “More than before”.

3.4.2 Qualitative Measures

The interview and focus group guides that were used as part of the qualitative evaluation of NewsWise were designed by the research team behind this report and then revised via an iterative process that involved gathering feedback from all the partners involved in the project – i.e., the National Literacy Trust and the PSHE Association.

The focus group guide aimed to explore children’s views and experiences of engaging with the news and of taking NewsWise. As such, it consisted of three main topics: 1) children’s engagement with the news and misinformation (which included questions such as “do you think it is important for you and people your age to know about the news?”), 2) what they liked or did not like as much about NewsWise (with questions such as “what was the most fun activity for you?”), and 3) impact of NewsWise (which included questions such as “do you think that now, after NewsWise, you know more about the news than you did before?”, and “since finishing NewsWise, do you think you are more interested in joining in activities in your community when you grow up?”).

Meanwhile, the interview guide was designed with a view to exploring teachers' views about children's engagement with the news as well as their views and experiences of delivering NewsWise. It consisted of three main topics: 1) children's engagement with the news and misinformation (including questions such as "How important do you think it is for children at this age (9-11) to engage with news stories?", 2) what they liked or did not like as much about NewsWise and whether they felt adequately prepared to deliver it (with questions such as "what did you think about the resources that were provided to you to deliver NewsWise", and 3) impact of NewsWise (which included questions such as "how effective did you feel the intervention was in improving your pupils' levels of news literacy?" and "in what ways, if any, do you think NewsWise might also have helped them develop a positive attitude towards community involvement?"

3.5 Procedure

3.5.1 Training / Delivery

The Guardian Foundation provided training to teachers who would be delivering the intervention prior to the commencement of the project. Teachers were also supplied with all the materials necessary to deliver the intervention. Following the training, and following the initial assessments, teachers delivered the NewsWise intervention for approximately one month before the second assessment.

All teachers took part in a training session delivered by the NewsWise team (one hour and 15 minutes). All classes received a two-hour workshop delivered by the NewsWise team. Teachers then delivered the unit of work consisting of 15 1-hour lessons. This typically took between three and five weeks to complete, depending on how schools incorporated this into their timetables (i.e., some schools delivered every day in the daily literacy lesson for three weeks, others delivered in a project-based way, while others may have delivered more sporadically depending on existing priorities for the school). All but two schools also took part in a journalist Q&A session, lasting between 30 minutes and 1 hour.

Most schools delivered the lessons during English/literacy lessons. Some schools also delivered the lessons during Personal Social Health and Economic (PSHE) education time. Some may also have used computing/digital literacy lessons. The NewsWise programme is mapped to the English (reading, writing, and oracy skills) and PSHE curricula meaning that nothing needs to be dropped from the curriculum; the programme covers skills that teachers already need to teach but provides a new context for learning these skills. All teachers were requested and strongly urged to complete all 15 lessons, but not all schools managed to do this.

A briefing sheet was sent to teachers providing a timeline for the evaluation, as well as details of what is involved at each stage. Clear instructions were provided regarding the assessments were provided to all, emphasising:

- Pupils in the intervention condition could still participate in NewsWise if they chose to withdraw from the study.

- In the intervention condition it was important that the lessons are taught as closely as possible to how they were described in the lesson plans so that the learning aims are met.
- In the intervention condition, if teachers believe a class has not experienced the full programme and not met the learning aims, they were asked to withdraw from the trial and not submit the post surveys.
- Teachers of schools in both conditions were asked to ensure that pupils all complete the first group of questions of each survey properly, as this was very important for matching purposes.

3.5.2 Data Collection

Teachers sought opt-out parents' permission for their students to take part. Following parents' informed consent, participants were invited to take part in this study during school hours. They read an information page and the study was also explained to them verbally by their teacher. If they wished to take part, they completed the measures listed above, and if not, they were given an alternative activity. Following completion of the survey, they were thanked for their participation and they returned to their regular school day. Some schools completed the measures online, and in a minority of cases, they completed hard copy versions. Where hard copies were returned, teachers posted these back to the research team in an addressed envelope supplied to them.

3.5.3 Interviews

Teachers were recruited through an invitation sent via email to the various intervention schools. The invitation detailed the nature of the interview, the estimated time commitment, and the voluntary nature of participation. Interested teachers were asked to provide informed consent, which emphasised their right to withdraw at any time without any negative consequences. The consent form was designed in accordance with the University of Birmingham's ethical guidelines, ensuring that participants were fully aware of their involvement and the use of the information they provided. Interviews lasted approximately 45-60 minutes and were audio-recorded with the participants' explicit consent. Participants were assured that all responses would be anonymised in any reports or publications resulting from the study.

3.5.4 Focus Groups

These focus groups were designed to be child-friendly, ensuring a comfortable and ethically sound environment for all participants. Children who had received the NewsWise programme were selected to participate in the focus groups with the assistance of their teachers, who helped identify willing participants. Prior to the focus groups, parents or guardians were sent an information sheet and a consent form via email or printed letter, detailing the purpose of the study, the nature of the focus group discussions, the estimated time commitment, and the voluntary nature of participation. This communication emphasised that participation was entirely optional and that children could withdraw at any time without any repercussions. Consent forms adhered to the University of Birmingham's ethical

guidelines, ensuring that parents and guardians were fully informed about the study and the use of the information collected. The focus groups were conducted in the children's regular classroom to provide a familiar and secure environment. Each session included 7-8 children and lasted approximately 30 minutes to accommodate the attention span and comfort of the young participants. The children's teacher was present during the sessions to provide additional support and ensure a safe and comfortable atmosphere.

3.5.5 Data Analysis

3.5.5.1 Missing Data

The trial protocol specified that the evaluation would use an intention-to-treat approach and therefore not exclude participants based on completion rates. The reasoning was that we were not assessing whether NewsWise works *only amongst those who are compliant*, but rather, whether the intervention works *as an overall package*, which includes whether it fits and would be adopted within existing curricula. A high preponderance of missing data was observed (see the CONSORT diagram in section 3.1). Below, the numbers and reasons for dropout are described in detail.

Intervention Condition

1. **Initial Participation (T1):** 830 baseline surveys were completed.
2. **Post-Intervention (T2):** 646 surveys were completed. Out of these, 543 could be matched with baseline data, implying that 103 participants at T2 were either new or their T1 data could not be matched.
3. **Follow-Up (T3):** 585 surveys were completed. Out of these, 449 could be matched with T1 data, and 419 with T2 data. 353 could be matched with both T1 and T2 data. This suggests that there were participants in T3 who either did not participate in or whose data could not be matched with T1 or T2.

Control Condition

1. **Initial Participation (T1):** 859 baseline surveys were completed.
2. **Post-Intervention (T2):** 604 surveys were completed. Out of these, 469 could be matched with baseline data, indicating that 135 participants at T2 were either new or their T1 data couldn't be matched.
3. **Follow-Up (T3):** 604 surveys were completed. Out of these, 401 could be matched with T1 data, and 363 with T2 data. 302 could be matched with both T1 and T2 data. This indicates that there were participants in T3 who either did not participate in or whose data could not be matched with T1 or T2.

Dropout Analysis

- **Dropout from T1 to T2:** The reduction in the number of surveys from T1 to T2 indicates dropout. For the intervention group, the dropout number is $830 - 646 = 184$ (22%). For the control group, it is $859 - 604 = 255$ (30%).

- **Dropout from T2 to T3:** Comparing T2 to T3, for the intervention group, the dropout number is $646 - 585 = 61$ (9%). For the control group, it is $604 - 604 = 0$ (0%; assuming no new participants).
- **Dropout from T1 to T3:** This is the reduction from T1 to T3. For the intervention group, it is $830 - 585 = 245$ (30%). For the control group, it is $859 - 604 = 255$ (30%).
- **Complete cases:** This is the number of people who could be matched across T1, T2, and T3. For the intervention group, it is 383 participants could be matched across all time points (46% of the 830 who completed baseline assessments). For the control group, it is 302 (35% of the 830 who completed baseline assessments).

Dropout vs. Data Matching Issues

The discrepancy between participants at each time point and those matched to previous time points suggests a range of possibilities:

- **Participant Dropout:** Participants who chose not to continue with the study for various reasons, or participants who completed the surveys and chose to redact their names as is their ethical right. There have also been especially high rates of [pupil absenteeism](#) in schools since the pandemic of 2019-21, which may result in a larger than normal proportion of pupils who could not be matched because they were simply absent at one or other measurement time point.
- **School Dropout:** When we contacted and chased schools by email and by phone to ensure surveys were completed, several challenges emerged.
 1. One whole school dropped out of the control condition ($N = 106$) due to competing curricular demands and assessments. Similar difficulties related to competing curricular demands were encountered with other schools, but the number of responses affected (as opposed to Participant Dropout) is unknown.
 2. At least one school did not complete all surveys due to key staff being off sick.
 3. At least one school's responses were affected by turnover of key staff.
 4. At least one school's responses were affected by key staff going on maternity leave.
 5. Only 7 out of 20 intervention schools submitted pupil reports to The Guardian Foundation at the end of the project, confirming that they completed the project in its entirety. More may have fully participated without teachers submitting pupil reports to confirm.
- **Data Matching Challenges:** Inability to match participants due to missing or inconsistent data (e.g., names left blank). Some teachers instructed pupils not to

include their names in the survey responses at all, or instructed them to use a pseudonym, introducing additional complications during matching.

Potential for Attrition Bias

The pattern and magnitude of dropout/matching issues could introduce attrition bias, affecting the study's representativeness and generalisability. Due to the high preponderance of missing data, it was ill-advised to impute missing data. Instead, after consulting with our advisory board, the following approach to handling missing data was adopted:

- (i) Analyse data from two time points at a time to maintain as many matched pairs as possible.
- (ii) Use baseline measurements to “predict” missingness at later time points to establish whether models are likely to be biased. If any given baseline characteristic predicted missingness later on, it was decided to control for that characteristic within the subsequent model to ensure the model is unbiased. This was not necessary, however, as no baseline characteristics predicted missingness at $r \geq .1$. Therefore, the assumption was made that data were missing at random, or close to it, allowing us to proceed with the planned modelling approach outlined below.

3.5.5.2 Quantitative

Quantitative data analysis aimed to follow the trial protocol published here: <https://jubileecentstg.wpengine.com/wp-content/uploads/2023/08/Final-Newswise-Trial-Protocol-5th-Sept-22.pdf> but it was necessary to deviate slightly. The protocol specified that:

- (iii) Descriptive statistics and inter-variable correlations would be explored for purposes of describing the sample. The sample is described in section 3.1 and inter-variable correlations are specified for RQ4 below.
- (iv) Baseline data would be used to validate a performance-based measure; this was achieved during the pilot phase, with input from members of our advisory board.
- (v) Confirmatory factor analysis would be used to re-establish the validity of our Civic Engagement measure in a wider sample; this was done under RQ2 below.
- (vi) For RQ3, the following parameters were specified:
 - a. A within-subjects independent variable, Time, with three levels. We deviated from this slightly by including two time points at a time (t1-t2 and t1-t3 respectively) for each analysis. Our reasoning was that this allowed us to minimise the effects of participant attrition.
 - b. A between-subjects independent variable, Condition, with two levels (NewsWise and Control)
 - c. A nested data structure, with Participants nested within Class, nested within Schools, nested within Condition, with Class and School set as random factors. We deviated from this slightly by excluding Class from the nested data structure because not all schools reported this data accurately. This decision was taken to achieve a balance between achieved sample size and our pre-

registered plan. Moreover, after consulting with members of our advisory board, we also decided to use Participant as a random factor.

- d. Given the nested structure of the data, we would use hierarchical linear modelling, with News Literacy as our primary outcome of interest, and Civic Engagement as a secondary outcome.

Therefore, the final theoretical model structure for the main analyses was:

Time (fixed: t1/t2; t1/t3) within

Participant (random: 1-1972) within

School (random: 1-40) within

Condition (fixed: NewsWise or Control).

3.5.5.3 Qualitative

Once collected, the focus group and interview data was transcribed, anonymised and subjected to thematic analysis via NVivo. Thematic analysis was conducted with a view to identifying codes describing portions of the data and to then aggregating the codes under more abstract, overarching themes (Braun & Clarke, 2006).

3.6 Ethics

To protect participants' confidentiality, all data, including audio recordings and transcripts, were stored securely. Access to this data was restricted to the research team. Identifiable information was removed from the transcripts, and pseudonyms were used in all disseminated findings to preserve anonymity. At the end of each survey, the final page provided a short debrief for participants. At the end of each interview, participants were debriefed to clarify any questions they had about the study and to provide them with support resources. This debriefing also served to help ensure that the participants did not experience any discomfort or distress during the interview. Participants were given contact information for the research team should they have any follow-up questions or concerns, or if they wished to receive a summary of the study's findings. To protect the children's privacy, all responses and data collected during the focus groups were treated with strict confidentiality. After each focus group, a brief debriefing session was conducted to ensure the children felt comfortable with the discussion and to clarify any misunderstandings. The teacher played an active role in this process, helping to reiterate the purpose of the study and address any concerns that might have arisen during the session.

This study, including the recruitment and consent process, was reviewed and approved by the University of Birmingham Ethics Committee, which ensured that the study complied with all ethical standards and guidelines for research involving human subjects.

3.6 Limitations

In our evaluation of the NewsWise intervention, several limitations merit attention. Firstly, the reliance on self-reported data, a necessity given the study's scope, introduces potential biases and subjectivity, possibly skewing the observed results. This is particularly pertinent for all outcomes except the "Detecting Fake News" metric. Notably, the self-reported results from qualitative analyses differed from self-reports based on surveys, as discussed later in our report. Secondly, high levels of dropout were observed, some of which was due to pupils' school absences, different populations at the time points and participants providing inaccurate data to be used for matching across time points. There, therefore, remains a possibility of non-random dropout patterns, especially among participants with initially negative news attitudes, potentially affecting longitudinal outcomes. This limitation was mitigated by the low ($r < .1$) associations between dropout probability and our baseline data, however. Concerns about the dropout rate and its effect on the ability to generalise results were investigated and our sensitivity analysis showed that the minimum detectable effect size with 80% power remained "small".

Our sample, though diverse, was not entirely representative of the UK school demographic, with a noticeable over-representation of lower-income schools. This limitation affects the generalisability of our findings and leaves the question of socioeconomic factors influencing news literacy open to further study. Additionally, the observed school-specific variation in the intervention's effectiveness, as indicated by our random effects models, hints at the influence of unique school environments on the efficacy of NewsWise. This variation underscores the importance of considering contextual factors in educational interventions and, based on the differential responsiveness of various schools, suggests a great deal of variation in intervention adherence. A significant methodological constraint was the absence of a fully psychometrically validated measure for news literacy in the targeted age group. Our efforts to ensure the validity and reliability of our measures were limited by this gap in the field, highlighting an urgent need for foundational research in developing robust measurement tools for news literacy rather than using bespoke or single-item measures. Nonetheless, the psychometric properties of our news literacy items were explored under RQ1 below. Also, the cluster randomisation aspect of our study, involving 40 clusters, though large relative to most educational trials, is relatively modest in number in absolute terms for randomisation purposes. This scale may not fully assure balanced baseline scores across schools, potentially impacting the robustness of our findings. This was mitigated against to some degree by cross-checking our pre-post analyses with equivalent models that instead controlled for baseline scores, but there is still some possibility of some interaction effects reflecting regression towards the mean in those analyses. Finally, our qualitative data revealed that some children found the surveys long and hard to understand in places. While this limitation is difficult to avoid completely, in piloting, steps were taken to minimise this issue. Specifically, children had the option to respond "I don't know" and "I don't understand the question", and items with a high number of these responses were excluded.

Each of these limitations, while posing challenges to the interpretation of our results, also opens avenues for future research and will be addressed below, reflecting our commitment to

rigorous and transparent research in understanding the dynamics of news literacy and civic engagement.

4 Findings

4.1 RQ1: How can news literacy and civic engagement be measured in 9–11-year-olds?

Finding 1: New framework and validated measures for news literacy suitable for younger pupils was created.

Existing news literacy measures were adapted to create a new framework and set of associated measures suitable for 9–11-year-olds as none previously existed. The new measures, which were first designed, piloted and then revised, sought to measure the constructs outlined in Table 1.

Hierarchical confirmatory factor analysis was used to assess the degree to which our data fit with the hypothesised dimensions of news literacy self-report measures (see Table 1; Appendix D for specific items and superordinate constructs). As our individual items provided ordinal data, a diagonally weighted least squares estimator was used with robust standard errors, and non-linear minimisation using bounded constraints optimisation. The model converged and fit the data very well ($\chi^2 [292] = 972, p < .001$; CFI = .97, TLI = .96, RMSEA = .06, SRMR = .06). Individual alpha and omega values for each subscale are included in the table below to show internal reliability. Values above 0.7 are generally considered “reliable”. As internal reliability does not apply to items scored on a binary scale (e.g., correct/incorrect), the Detecting Fake News test was not included in Table 3 below. Theoretically, though, this fits with Dimension 3.

Table 3: News literacy framework and measurement constructs

Dimension	Construct	α	ω
Dimension 1: Attitudes towards news reporting and trustworthiness Definition: An appreciation of the importance of news reporting in terms of quality and trustworthiness	Construct 1A: News motivation Definition: the motivation required to engage with the news	.76	.77
	Construct 1B: News attitudes Definition: Beliefs that news should be balanced, honest, fair, and useful	.71	.72
Dimension 2: Knowledge of news production and consumption	Construct 2: News knowledge	.54	.55

Definition: An understanding of the processes of news production and consumption, of the news industry, and of the role of audiences	Definition: An understanding of the processes of news production and consumption, of the news industry, and of the role of audiences		
Dimension 3: Evaluation skills and strategies Definition: The ability to deploy different strategies to evaluate the trustworthiness of information and news stories	Construct 3A: News evaluation self-report Definition: The self-reported ability to evaluate the trustworthiness of news stories	.69	.69
	Construct 3B: News vigilance Definition: The self-reported actions taken if/when confronted with misinformation	.43	.47

The psychometric properties of the constructs provided empirical validation for the underpinning theoretical framework. The framework and new set of measures can be used in future studies to measure news literacy in 9- to 11-year-olds. However, a note of caution is required for constructs 2 and 3b in Table 1 as they were not internally reliable. One possible reason for this is that each subscale has relatively few items. Therefore, future studies might attempt to develop more comprehensive assessments along these dimensions of news literacy. One other factor to consider is that constructs like News Knowledge may be heterogenous by their very nature, and so it may make more sense to analyse findings item by item.

Finding 2: New constructs and measures for civic engagement suitable for younger pupils were created.

As no measure for civic engagement was available at the start of this study, a new measure was created in a pilot study with a sample of 655 participants prior to conducting the main study (see McLoughlin et al., 2023). The excellent model fit from the published pilot data was replicated in the baseline data from the NewsWise study ($\chi^2 [32] = 140, p < .001$; CFI = .98, TLI = .97, RMSEA = .04, SRMR = .03). This measure consists of the following three constructs, each of which shows strong internal reliability (see Table 4).

Table 4. Civic engagement framework and measures

Construct	Definition	α	ω
Awareness	Awareness of the issues that pertain to the socio-political context.	.76	.76
Attitudes	Positive attitudes towards community and political life and towards one's own rights and responsibilities as a citizen.	.80	.81
Action	Participation in community and political activities in the present time.	.75	.75

All three constructs were found to have good psychometric properties and suitable for use in further studies seeking to measure civic engagement in 9- to 11-year-olds.

4.2 RQ2: What are 9-11-year-olds' self-reported levels of news literacy and civic engagement?

Finding 3: 9–11-year-olds believe the news should be truthful and balanced, but less than half know how to spot fake news and only three in ten are interested in the news.

Baseline data from the control and experimental groups ($N = 1972$) was used to understand 9- to 11-year-olds' baseline levels of self-reported news literacy. It should be noted that the sample was broadly representative geographically but skewed towards schools with high free school meals. Notable findings from this analysis include that 9- to 11-year-olds (all % are strongly agree or agree):

- Believe that news stories should be truthful (86%).
- Believe that fake news is bad (84%).
- Believe that news stories should be balanced (81%).
- Believe they can tell the difference between fact and opinion (73%).
- Believe it is difficult to tell if information online is trustworthy (62%).
- Stop and check facts before believing the news (59%).
- Can name trustworthy places to find news (52%).
- Find it is easy to tell if a news story is real (52%).
- Know how to spot "fake news" (47%).
- Often read, watch or listen to the news (42%).
- Are interested in the news (35%).
- Read a newspaper to stay informed about the news (19%).

A MANOVA was used to test for gender differences in our individual items. Overall, there was a difference between genders on our key items (Pillai's Trace = .14, $F[66,1246] = 1.37$, $p = .028$). Specifically:

- Girls were significantly more likely to stop, think, and check facts before believing news.
- Girls were also more likely to talk with their parent(s) or guardian(s) about stories in the news.
- Girls were more likely to talk with their friends about the news.

Finding 4: 9–11-year-olds have positive attitudes to civic engagement. Five in ten, however, think that they will vote when they grow up, and only 35% talk about politics and social issues with their parents.

Baseline data from the control and experimental groups was used to analyse the participants' attitudes towards civic engagement.⁶ Notable findings from this analysis include 9–11-year-olds believe:

- It is important to support charities (90% strongly agree or agree).
- It is important to know what is happening in the world (90% strongly agree or agree).
- That they want to be the sort of person who helps others whenever they can (88% strongly agree or agree).
- That helping others makes them feel good (88% strongly agree or agree).
- That adults should vote in elections (68% strongly agree or agree).
- When they grow up, they will regularly volunteer their time for good causes (61% Strongly agree or agree).
- Adults should take part in peaceful protests (57% Strongly agree or agree).
- When they grow up, they will vote in an election (49% extremely likely or likely).

There were no significant gender differences on the civic engagement variables.

4.3 RQ3: Does the NewsWise programme improve the news literacy and / or civic engagement of 9-11-year-olds?

4.3.1 Findings from the quantitative analysis

Item-level Analyses

An item-by-item breakdown of change in self-reported News Literacy and Civic Engagement based on Timepoint and Condition, accounting for the random effects of Participant and School, can be found in Appendices B and C. There were some small positive effects of the NewsWise intervention on News Literacy and Civic Engagement which should be interpreted tentatively. Notably, although pre-post self-reports and the intervention group's reflective

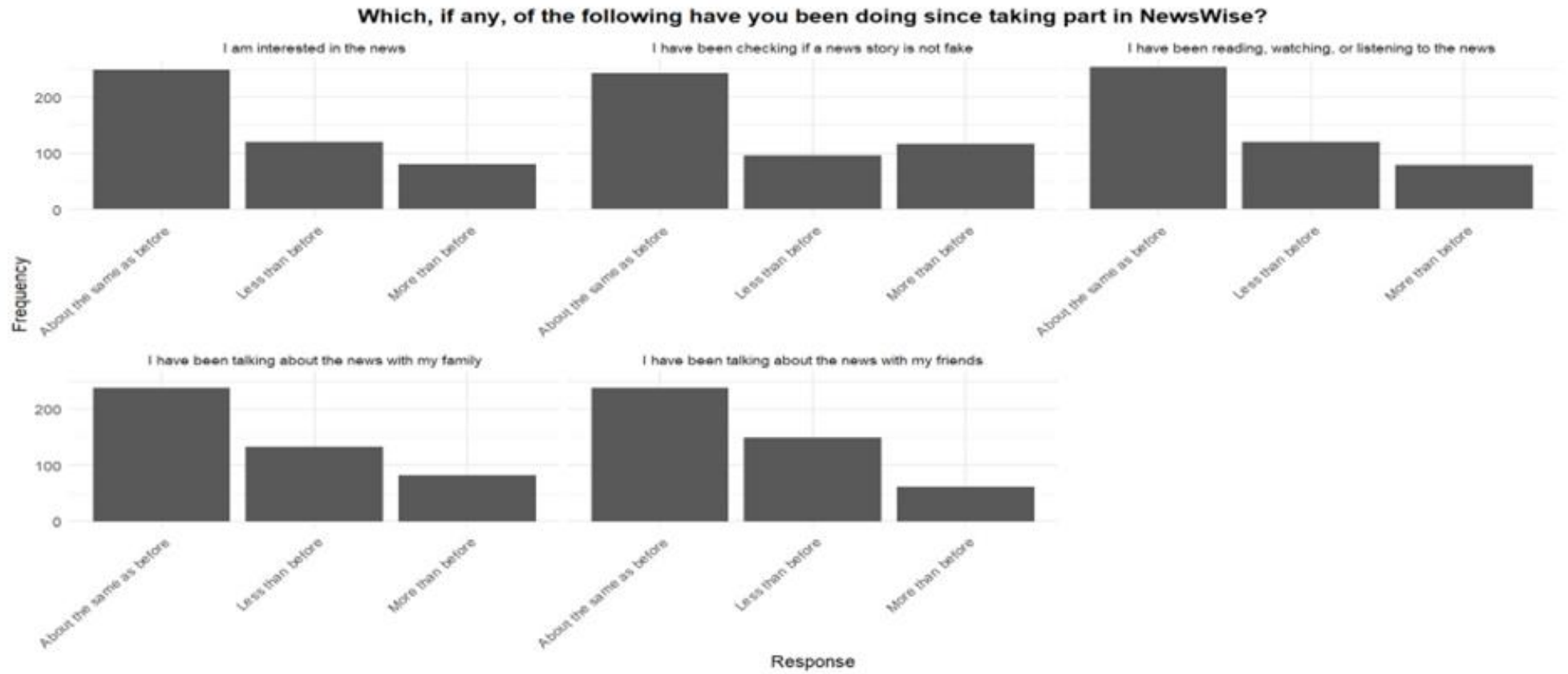
⁶ It should be noted that the sample was broadly representative geographically but skewed towards schools with high free school meals

self-reports of NewsWise effectiveness were suggestive of null results, there did appear to be an effect of the NewsWise intervention on our objective tests of the ability to detect fake news.

News Literacy

We began by looking at the questions that asked participants in the NewsWise intervention group to reflect on whether they thought that their News Literacy levels changed over time. As can be seen in the plot below for the news literacy reflective questions, participants' responses were equivocal, albeit with "Less than before" generally being selected more frequently than "More than before" (see Figure 4).

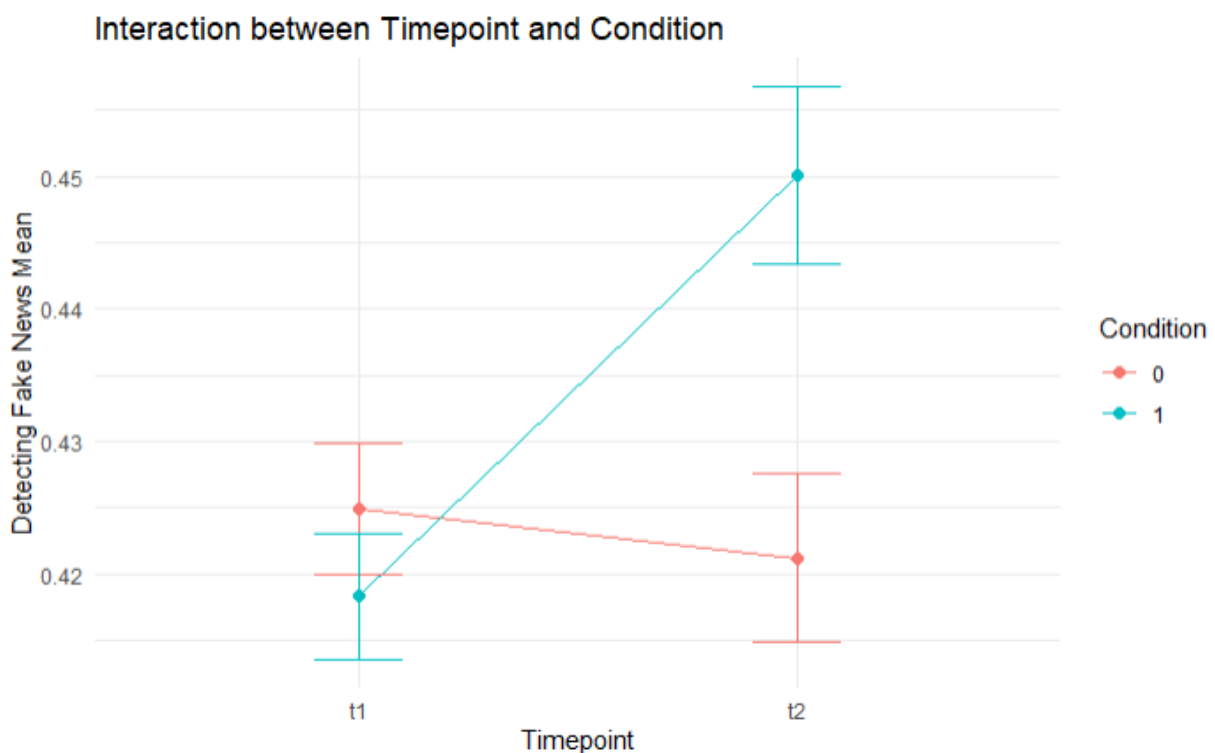
Figure 4. *Self-reported effects of NewsWise on News Literacy three months after the intervention.*



NewsWise Shows a Moderate Effect on Detecting Fake News at Post-test

With participants not self-reporting any effects of the intervention, it was important to see if this would translate to their actual performance on our objective Detecting Fake News test (see Figure 5). Surprisingly, there appeared to be a small initial intervention effect from immediately before to immediately after the NewsWise intervention (Timepoint*Condition $Estimate = 3.255e-2$, $SE = 1.019e-2$, $t = 3.194$); note here that a t value greater than 1.96 or less than -1.96 suggests a statistically significant effect. Specifically, the control group's (i.e., Condition 0 in the plot below) average "Detecting Fake News" score stayed about the same from Time 1 ($m = .42$, $sd = .15$) to Time 2 ($m = .42$, $sd = .14$). While the NewsWise intervention group's (Condition 1) scores rose from Time 1 ($m = .42$, $sd = .14$) to Time 2 ($m = .45$, $sd = .17$). That is, there appeared to be an improvement in Detecting Fake News scores in the NewsWise group only from immediately pre- to immediately post-intervention.

Figure 5. The effects of the NewsWise intervention on Detecting Fake News scores from $t1$ to $t2$.

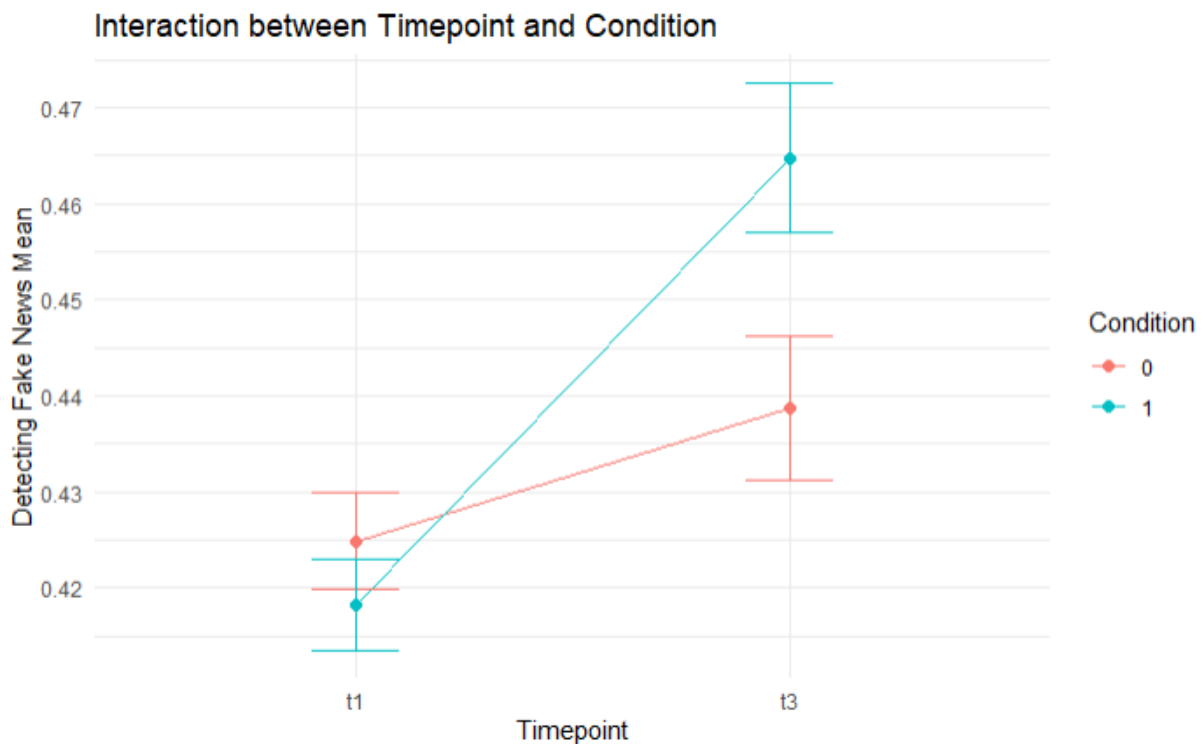


NewsWise Shows a Moderate Effect on Detecting Fake News at Follow-up

Broadly speaking, this advantage was maintained at the three-month follow-up (Timepoint*Condition $Estimate = .03$, $SE = .01$, $t = 2.53$; see Figure 6). Specifically, the control group's average "Detecting Fake News" score rose only slightly from Time 1 ($m = .42$, $sd = .15$)

to Time 3 ($m = .44, sd = .16$). Nonetheless, the NewsWise intervention group's scores rose to a greater degree from Time 1 ($m = .42, sd = .14$) to Time 3 ($m = .46, sd = .18$).

Figure 6. *The effects of the NewsWise intervention on Detecting Fake News scores from t1 to t3.*



News Literacy Scores Were Also Affected by School- and Participant-level Variables

Our analysis of the NewsWise intervention reveals a nuanced picture of its effectiveness in improving news literacy, both at the post-test and follow-up stages, with variations observed across schools and individual participants.

At the post-test, we noted variability in the initial scores of participants within the same school (random intercept variance: 0.0041, standard deviation: 0.0641), indicating that the intervention's impact varied even among individuals from the same school environment. Similarly, at the individual participant level, we observed differences in baseline news literacy skills across different participants (random intercept variance: 0.0019, SD = 0.0432), irrespective of their school. This points to inherent differences in participants' abilities to detect fake news before the intervention.

Additionally, there was a residual variance of 0.016957 (standard deviation: 0.13022) at this stage, indicating unexplained variability in test scores that might be influenced by factors not captured by our model, such as external influences or individual learning experiences.

At the follow-up stage, these trends persisted. Variability in baseline scores was again observed within the same school (random intercept variance: 0.003169, standard deviation: 0.05629), and across individual participants (random intercept variance: 0.001956, standard deviation: 0.04423), highlighting the role of individual characteristics and specific school-related factors in shaping initial responses to the intervention. The residual variance at this stage was 0.018839 (standard deviation: 0.13726), suggesting ongoing influences from factors outside our model.

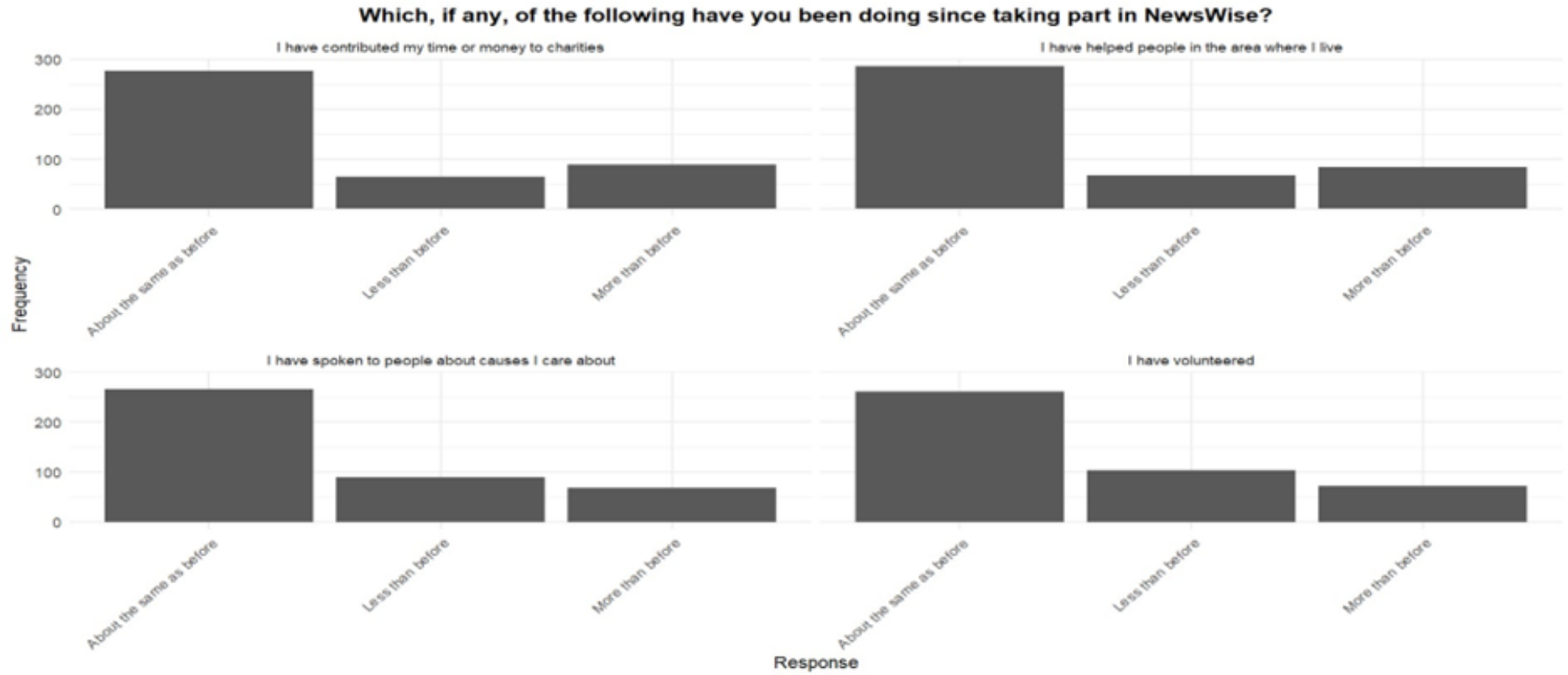
We calculated standardised effect sizes for the intervention at both stages. At post-test, the effect size was moderate at 0.36, while at follow-up, it was 0.40, indicating a positive trend in news literacy improvement due to the NewsWise programme. However, the presence of random effects at both stages underscores the complexity of factors influencing this improvement. Our findings highlight the importance of considering individual and contextual differences when evaluating the impact of the NewsWise intervention, as these differences play a significant role in its effectiveness.

Civic Engagement

As before, the perceived effects of the intervention on civic engagement were null when students in the NewsWise group reflected on the intervention’s effects three months later (Figure 7). This was corroborated by non-significant effects of the intervention on the three aspects of civic engagement: awareness, attitudes, and actions. Descriptive statistics for the civic engagement outcomes are presented in Table 5.

	Timepoint 1 Control Mean (SD)	Timepoint 1 NewsWise Mean (SD)	Timepoint 2 Control Mean (SD)	Timepoint 2 NewsWise Mean (SD)	Timepoint 3 Control Mean (SD)	Timepoint 3 NewsWise Mean (SD)
Civic Engagement Awareness	2.89 (1.02)	2.72 (1.06)	2.90 (1.09)	2.74 (1.03)	2.86 (1.04)	2.90 (1.01)
Civic Engagement Attitudes	1.72 (0.70)	1.65 (0.66)	1.80 (0.83)	1.69 (0.75)	1.83 (0.76)	1.90 (0.86)
Civic Engagement Actions	2.17 (0.86)	2.09 (0.90)	2.12 (0.88)	2.14 (0.89)	2.23 (0.93)	2.19 (0.92)

Figure 7. *Self-reported effects of NewsWise on Civic Engagement three months after the intervention.*



4.3.2 Findings from the qualitative analysis

As shown below, what stood out consistently from the qualitative evaluation of the programme is that, by the end of the programme, pupils 1) were more interested in, and better equipped to engage with, the news, 2) developed a critical awareness of the news and whether this may (or may not) be trusted, and 3) learned different strategies that may be undertaken to assess the veracity of news stories.

Pupils' engagement with news

Following completion of the programme, many pupils reported, in the focus groups, that NewsWise helped them to develop an interest in the news. As shown in the following extract from one of the focus groups:

Pupil 1

Before NewsWise, I, like, I didn't really like to read the news or watch the news... [Now,] I feel more intrigued to read the news.

Pupil 2

If I'm being honest, I wasn't interested in news. But after we started NewsWise, I got really attached to news and I started telling my friends about it.

School A, focus group 2

Similarly, as reported by another pupil from another focus group:

I wasn't really interested in just watching news. I thought it was kind of boring. But after NewsWise, I thought, actually, I can watch it. And there are actually some interesting things on there. So, I started watching it a little bit more.

Pupil 2, School B, focus group 1

Both pupils and teachers thought it is important for children aged 9-11 to develop an interest in, and follow, the news. As explained by one of the teachers who delivered NewsWise:

Researcher

You think it is important that children this age an interest in the news?

Teacher

Yes. I think people need to find a way to interest kids in news, because it's not how it was when we were growing up. They don't really have access to it like we did... This generation, they're very different to how we were when we were growing up. So, when we first started teaching the lesson, I realised not many children watch the news. They really didn't know much about the news. And that's everybody's got a different phone. When I was growing up, there was one TV. My dad wanted to watch the news, we all had to watch it. But now is they don't really have access to the news because they have so many different devices at home, and no 9-year-old is gonna say, oh, I'm gonna go on the phone and watch the news.

School C, teacher interview 1

However, both pupils and teachers recognised that news stories can sometimes be upsetting, which is why, when it comes to children's engagement with news, this needs to be age appropriate. As discussed in one of the focus groups;

Pupil 7

Depending on what news story that is, it might hurt our feelings and put us in stress by thinking is that going to happen to us.

Pupil 2

Like, if the news is talking about something in your society, like, in where you live, and they're talking about stuff, like maybe there's fire there around your cousin's, you might get worried and stressed.

School C, focus group 3

Relatedly, as emphasised in another focus group:

I feel like some news might be good for kids because it might be about school or like something you want to know about. Some things might be for like parents like Brexit news, or like some like Prime Minister news and stuff like that.

Pupil 3, School A, focus group 2

Pupils' critical awareness of news

Many pupils reported in the focus groups that the NewsWise programme made them more aware that not all news stories can be trusted as these may be subjected to issues of bias or misinformation. As remarked in one of the focus groups: "sometimes they like don't even... say facts..., they just say opinions" (Pupil 4, School A, focus group 1). And as discussed in another focus group:

Pupil 2

Some people might not tell the full story.

Pupil 4

So, there might be ... someone's opinion on the news and you might think it's a fact...

Pupil 6

The news could be one sided because ... someone could just give one side of the argument and not the other.

School A, focus group 2

Similarly, pupils acknowledged that news stories may be subjected to issues of misinformation, especially when it comes to stories and information that circulate on social

media. This is something that many of them came to appreciate as a result of taking NewsWise. As commented by a pupil in one of the focus groups:

I think I do know more about the news now. Because when I [saw] a news story [before], I [didn't] really like check if it's fake or anything, because I didn't really, like, think that there would be a lot of fake news. But now, ...now that we did the NewsWise stuff, ...I can actually check and ... if [a news story] is fake or real.

Pupil, 7, School C, focus group 3

Pupils' awareness of and strategies to spot misinformation

The qualitative data shows consistently that, thanks to the NewsWise programme, pupils became more aware of the “fake news” phenomenon and provided examples, during the focus groups, of different strategies they learned that can help them identify misinformation online. The programme encouraged pupils to reflect on and appreciate the negative implications of misinformation. As shown by the below:

Researcher

Do you think fake news can have a negative impact...?

Pupil 6

I think that, with false information being spread, it could cause people to act differently and like break laws and stuff like that.

Pupil 4

...it can also make them very depressed...

Pupil 2

Sometimes people will spread fake news because they want people to think a certain way. For example, let's say, voting for president, they say that one candidate has done this bad thing, but the other one hasn't. But not in reality.

School D, focus group 2

Conscious that misinformation may have negative repercussions not just for individuals but also for society and the political system at large, pupils were keen, during the focus groups, to talk about some of the different strategies, which they had learned thanks to NewsWise, that may be used to verify the veracity of information online. As shown below:

Pupil 4

I found the “stop, question, think and decide” very helpful, [...so when I come across a news story,] I normally stop, question, think and decide whether it's real or fake...

Researcher

That's really good... what [other] things do you remember from the programme that you can do to spot fake news?

Pupil 4

Spelling mistakes, or the link, for example, if there's just random letters on it and ... that's just not really a link. So then, um, then we could also check for the headline...

Pupil 7

[And I] would search up news and see if, like, other news stories had reported the same thing...

Pupil 6

If ... there's a website that you trust, [you can spot misinformation by] comparing [the news story] to that...

Pupil 5

[And] you have to check if the picture matches up....

Pupil 3

[And] check if the source is reliable, for example, it could be a random source...

Pupil 2

You could check on different websites. You can check the reporter and the journalist and their name to see if they're real.

School C, focus group 2

Views and experiences of NewsWise

In terms of both pupils' and teachers' views and experiences of NewsWise, many comments were made, during the focus groups and interviews, that suggest (i) what worked best and what pupils and teachers liked about the programme, and (ii) how NewsWise may be improved in the future on the basis of what did not work as effectively.

What worked best

Not only did pupils consistently find the programme both enjoyable and helpful, but so did teachers, who liked most of the resources and, thanks to the training they received prior to delivering NewsWise, felt adequately prepared. As commented by a pupil: "I think [NewsWise] was really fun and I learned a lot about how to spot fake news" (pupil 3, school E, focus group 1). In addition, as explained by another pupil: "we've learned how to be a journalist, which may be helpful in the future if you might want to be a journalist, so you might have some background knowledge of how to get into that job" (pupil 4, school E, focus group 2). Similarly, teachers thought that a programme like NewsWise is effective in teaching pupils what they need to know, particularly when it comes to the skills required to spot misinformation online, in order to engage with news both safely and critically. As remarked by a teacher: "I liked [NewsWise] because it was relevant to our children. You know, we do a

lot of work about internet safety and things like that so those lessons have dovetailed in very well with what we were doing" (school E, teacher interview 1). Relatedly, as discussed by another teacher: "especially nowadays with social media, and getting all the different kinds of news, for [children] to be engaged and knowing what is fake news, what is real news..., [that]'s very important" (school D, teacher interview 1).

With this in mind, what both pupils and teachers enjoyed the best about the programme included the lessons on how to spot misinformation online and the activity on how to produce a news report. The latter was particularly enjoyable for children as they were asked to play different roles (e.g., editor, sub-editors, journalists) and interview other pupils with a view to writing a story on a given topic relating either to their school or their local area. As shown by the quotation below:

Researcher

So, can you tell me what you liked about NewsWise?

Pupil 3

My favourite part of it was seeing different types of stories, and like finding out if they are true or false. And then when we wrote about our story that we were going to do, it was like fun because we got to find out what had been happening all around our area....

Pupil 2

Planning the story was, before writing, it was very fun...

Pupil 5

So, I liked spotting fake news, because that does help me to find fake news.

School D, focus group 1

Similarly, as commented by a teacher:

I can say I've spoken to a couple of teachers as well [...and] I think that they really did enjoy it when they had that workshop when they to present the news, to take a new story and be reporters... and also..., the element of analysing fake and real news.

School C, teacher interview 2

Teachers, in addition, remarked on how helpful they found the NewsWise resources, while also adding they found adequately prepared to use these and deliver the programme. As commented by a teacher: "I thought it was really well thought through. I thought the resources were very good quality. A lot of the faculty got that pack at the beginning to get them engaged in the first place" (school E, teacher interview 1).

Similarly, as explained by another teacher:

Well, I think because we'd attended the session before online sort of introducing the programme, I think we had a good understanding of what it was about. I think it's good how all the resources were sort of laid out and with the lesson plans, how it's organised on the website.

School D, teacher interview 2

How to improve NewsWise

During the focus groups and interviews, pupils and teachers also discussed aspects of the programme that they did not like as much and thought could be improved when delivering NewsWise in the future. Some pupils thought that some activities, despite being helpful as in the case of those focusing on misinformation, were slightly repetitive. As remarked by a pupil: “[NewsWise] got a bit repetitive ... because you just kept looking at the same thing over and over again about how the news could be fake” (pupil 3, school F, focus group 1). In addition, as explained by another pupil, some of the assignments were slightly demanding: “every time I'm on the clock, when we have to put in our morning work, sometimes the quizzes are quite a few questions” (pupil 6, school B, focus group 2). In addition, while most pupils enjoyed the news reporting activity, some did not enjoy the writing element of that activity as much as the role play. As emphasised by a pupil: “[what] I did not like was ... writing [the report] because it took like many lessons to just get to the final draft” (pupil 9, school D, focus group 2).

Meanwhile, some of the teachers who delivered NewsWise would have preferred a slightly more condensed version of the programme. As explained by a teacher:

I enjoyed all aspects of it. And I thought it was great ... other than the fact that I thought ... it was a bit slow. I think maybe those first two weeks could be condensed down ..., so they won't need to be specific lessons, each one for every small step, so you might be able to do sort of fact and opinion and then bias together.

School D, teacher interview 3

At the same time, some teachers would have wanted to see more differentiation in terms of the resources and how these may be delivered to pupils with different needs. As emphasised by a teacher:

There's still always going to be those children who will sit back and do nothing, so there's those lower ability children who maybe can't access the reading the text as much as the other children, those that are not as vocal as the other children.

School B, teacher interview

What is more, while some pupils found the writing element of the news reporting activity slightly lengthy and boring, teachers would have wanted to see more writing activities embedded in the programme.

We didn't have enough writing, things for them to write about... my suggestion is [...to have] more opportunities to write more news reports, instead of just one big project at the end.

School D, teacher interview 1

Finally, both pupils and teachers found the surveys, which were used to evaluate NewsWise and administered to pupils at the beginning and the end of the programme, slightly long. Both pupils and teachers would have preferred shorter surveys and wanted some of the questions to be worded in ways that could have been more accessible. As shown below:

Pupil 2

The language was a little bit difficult to understand.

Pupil 4

And [the survey] was a bit long for me.

School D, focus group 1

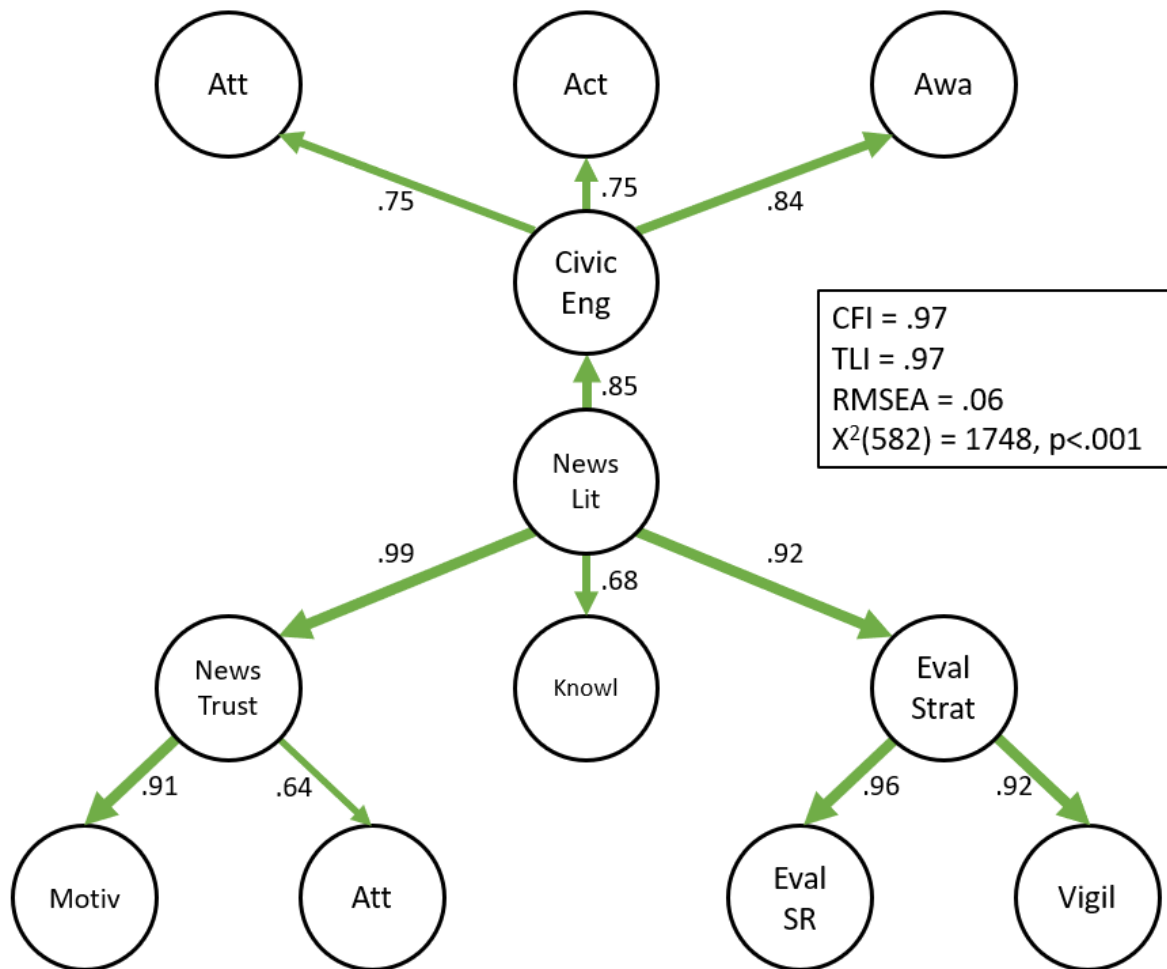
Similarly, as remarked by a teacher: “I think [pupils] started off sort of engaged and [...then] I could see their concentration ... fading slightly” (school G, teacher interview). As added by another teacher: “when they were doing the surveys, the children found the language a bit harder” (school C, teacher interview 1).

4.4 RQ4: What, if any, is the relationship between news literacy and civic engagement?

4.4.1 Findings from the quantitative analyses

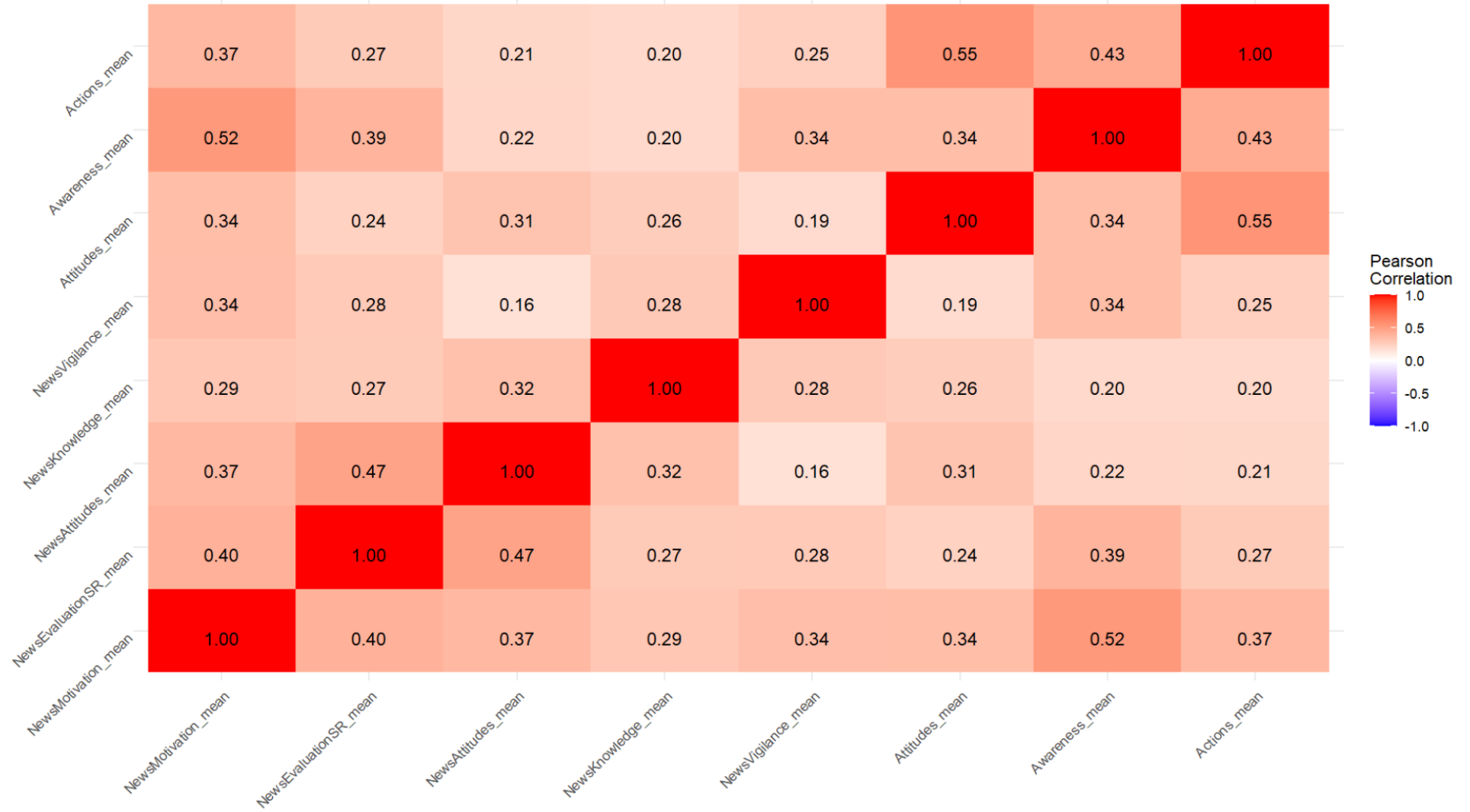
Structural Equation Modelling (SEM) was used to create a latent News Literacy variable that would be used to predict a latent Civic Engagement variable. Diagonally Weighted Least Squares was used as the estimation method due to the non-normality of data observed within the previous section, and robust standard errors were used to mitigate violations of homoscedasticity. The model fit with all variables included was excellent ($CFI = .97$, $TLI = .97$, $RMSEA = .06$; $\chi^2[582] = 1748$, $p < .001$), well above both the “acceptable” threshold of .9 and the “ideal” threshold of .95. The plot illustrating this SEM can be found in Figure 8 below (Note: this contains latent variables only due to spacing issues, rather than this being a manifest SEM; observed variables were included within the model). There was a relatively strong relationship between News Literacy and Civic Engagement ($\beta = .85$; $b = .35$, $SE = .03$).

Figure 8. Path diagram for a structural equation model predicting Civic Engagement with News Literacy.



Furthermore, correlational analyses are presented in Figure 9 below. As seen below, bivariate correlations show strong positive relationships between all news literacy and all civic engagement measures.

Figure 9. Correlation matrix including our main News Literacy and Civic Engagement constructs.



This analysis of the relationship between News Literacy and Civic Engagement provides considerable empirical weight to the underlying theoretical premise for this study. We hypothesised a relationship between 9–11-year-olds' news literacy and their civic engagement. Strong relationships were found between both, showing that news literacy levels can be used to predict civic engagement and *vice versa*. This is the first study to test for and discover a link between news literacy and civic engagement in 9–11-year-olds and adds weight to those calling for increased news literacy education in schools, suggesting that this might have benefits to society writ large.

4.4.2 Findings from the Qualitative Analysis

As shown below, analysis of the qualitative data suggests that the NewsWise programme was effective in developing not only pupils' news literacy but also their 1) civic awareness, and 2) positive disposition towards civic involvement. These themes, however, did not emerge as prominently as the rest of main themes from the qualitative data, which suggests that the programme has a primary potential to cultivate news literacy in pupils and, only to some extent, their civic engagement. This did not come as a surprise, considering that NewsWise was designed with news literacy, but not civic engagement, at its heart. At the same time, it is evident from the thematic analysis of the qualitative data that it has also some potential to develop some aspects of civic engagement in children.

Pupils' civic awareness

Engagement with news is not just an integral part of the ability to deploy news literacy skills but can be considered to be a dimension of civic engagement itself, since it is crucial to keeping abreast of socio-political issues and public life more broadly. As such, during the focus groups some pupils remarked on the extent to which they found their engagement with news stories essential for gaining awareness of what goes on around them within the local communities and, more broadly, both nationally and internationally. As some pupils emphasised:

Pupil 2

We should really know about the news because we need to know what's happening in our community.

Pupil 4

I think children should be able to know about news because then they need to be aware of what's going on...

Pupil 6

[And it] helps them to ... know what to do in the future....

Pupil 1

If they have family in a different area, it might let them know what's happening ... and if they're in danger.

School A, focus group 1

Similarly, as remarked in another focus group:

Pupil 3

We could be interested in, like, sports ... on the news.

Pupil 2

[And] there might be some significant news like, you know, the Russian war with Ukraine that you might want to know about to see how it's going, like what's going on.

Pupil 6

[Also,] kids might like to see like who's the new prime minister

School A, focus group 2

Teachers who delivered the programme also discussed how important it is to encourage children to engage with news in order to develop their civic awareness. As discussed by a teacher: "I think it's super important that they are looking at news and searching out news and engaging in it to find out about things both in their local area and on a national and global scale" (school D, teacher interview 2).

Pupils' disposition towards civic involvement

Some pupils also acknowledged that knowledge of what goes on around you can prompt you to take action. In this case, pupils referred primarily to the possibility of acting within their schools and local communities, and in ways that are aimed at supporting (mainly through volunteering and donating money) the most vulnerable groups. As such, their remarks suggest that NewsWise can contribute to children's positive disposition towards civic involvement – a disposition that is future-oriented and relies on their engagement with news. However, it is important to bear in mind that this theme did not emerge as prominently as the rest of the themes presented here and that pupils' remarks on their disposition towards civic involvement were rather limited. As shown by the below:

Pupil 2

The NewsWise programme ... makes me want to do different activities in our school [...and] it's really good to help your community by helping around the neighbours.

Pupil 3

It's inspired me to help out the needy people.

School C, focus group 2

Similarly, as remarked by a pupil in another focus group: "If there [...were] things that were happening ..., you can ..., if you have the time, do what will help what's around you" (Pupil 7, school C, focus group 1).

5 Implications

Based on a mixed methodology, this study was conducted to evaluate the second iteration of NewsWise – a programme developed by The Guardian Foundation that was designed to equip primary school children aged 9-11 in the UK with the news literacy skills they need in order to thrive in the digital age. Engagement with the news is an integral part of civic engagement (understood as community involvement, acts of service and political participation that is appropriate to children’s age). With this in mind, and with a view to filling relevant gaps in the literature, this study aimed to answer the questions of (i) how news literacy and civic engagement can be measured in 9–11-year-olds? (RQ1); (ii) what are 9-11-year-olds’ self-reported levels of news literacy and civic engagement? (RQ2); (iii) whether, and if so to what extent and in what ways, the NewsWise programme improve the news literacy and/or civic engagement of 9-11-year-olds (RQ3); and (iv) whether there is a relationship between their development of news literacy and civic engagement (RQ4).

In response to RQ1 above, this study produced a new set of validated instruments for measuring news literacy and civic engagement in 9-11-year-olds. The instruments proposed here, which were designed, piloted and tested prior to conducting this study, incorporate dimensions that were found to have good psychometric properties. We propose here that news literacy can be measured in 9-11-year-olds against six key dimensions that relate to (i) their interest in the news (news motivation), (ii) their appreciation of quality news reporting (news attitudes), (iii) their knowledge of news production and consumption processes (news knowledge), (iv) their self-reported ability to evaluate the trustworthiness of news stories (news evaluation self-report), (v) their actions in response to the possibility of coming across a new story that may not be reliable (news vigilance), and (vi) their ability to identify real and false news stories through a performance tasks (as in the case of the one used as part of this study). Building on pre-existing instruments and studies in this area, which have prioritised different dimensions of the news literacy of adolescents and adults (e.g., Ashley et al., 2013; Maksl et al., 2015; Vraga et al., 2015), the measures proposed here contributes to research by providing tools for measuring the news literacy of young children aged 9-11.

Meanwhile, as proposed here, civic engagement can be measured in 9-11-year-olds against three key dimensions that relate, in ways that are appropriate to their age, to (i) their appreciation of the importance of civic life and of their responsibilities as citizens (attitudes), (ii) their awareness of and interest in issues that pertain to the socio-political context (awareness), and (iii) their participation in society and in civic life (action). Similarly, whilst most research and instruments have focused on different dimensions of the civic engagement of adolescents and adults (e.g., Doolittle & Faul, 2013; Flanagan et al., 2007; Schulz et al., 2022), this measure builds on pre-existing instruments to provide a tool for how to measure the civic engagement of 9-11-year-olds.

It follows that the instruments developed as part of this study are suitable for use in further studies seeking to measure the news literacy and/or civic engagement of 9-11-year-olds. As such, they may be used by future researchers – as well as a range of stakeholders including policymakers, educators and civic society practitioners – seeking to capture levels of news

literacy and/or civic engagement among children aged 9-11 within the broader population in the UK and/or in other English-speaking countries. Relatedly, the instruments may be used as part of the evaluations of future educational interventions aimed at improving 9-11-year-olds' levels of news literacy and/or civic engagement. One note of caution: the news literacy measure presented here may require further refinement and ideally a full bottom-up psychometric study if funders are amenable. It was not within the scope of this study to provide a full bottom-up psychometric analysis of news literacy. However, there was a heavy reliance on measures used by other researchers, many of which were bespoke and not designed by psychometricians.

In response to RQ2 above, this study produced a reliable baseline of 9-11-year-olds' self-reported levels of news literacy and civic engagement measured prior to the delivery of the NewsWise programme. Key findings include that, while almost nine in ten children believe that news stories should be truthful, only less than six in ten stop and check facts before believing the news, with less than five in ten reporting that they know how to spot misinformation. At the same time, nine in ten children believe it is important to support charities and to know what happens in the world. Only six in ten, however, reported regularly volunteering their time for good causes. In addition, only five in ten think that they will vote when they grow up, and only 35% talk about politics and social issues with their parents. These findings, which are the first of their kinds to focus on the news literacy and civic engagement of young children aged 9-11 in the UK, fills a gap in research. As such, they show what dimensions of 9-11-year-olds' news literacy and civic engagement are less developed and may require therefore more attention when designing future interventions. In addition, they have the potential to enable future research to produce longitudinal comparisons over the years.

In response to RQ3 above, this study found that NewsWise was effective in developing children's ability to detect real versus fake news using an objective performance-based test, thus providing useful directions for how news literacy can be educated. In this way, this study contributes to research in this area which, despite being still in its infancy and focusing primarily on the United States and older children, has championed the effectiveness of school interventions designed to improve news literacy among students (e.g., Ashley et al., 2017; Martens & Hobbs, 2015). Findings from this study, which suggest which aspects of NewsWise worked best or might need improving, can be utilised to make future revisions to NewsWise and when designing new, and/or revising current, news literacy programmes. This project found that NewsWise was effective in developing not only children's news literacy (RQ3) but the qualitative analysis also hints at its relevance to their civic engagement too. This resonates, again, with research in this area that has established a positive relationship between students' participation in news literacy programmes and their knowledge of current events and intention to participate in civic life (Ashley et al., 2017; Kahne et al, 2012; Kahne & Bowyer, 2019; Martens & Hobbs, 2015).

Analyses performed in response to RQ4 above showed that there are strong correlations between all the different dimensions of children's news literacy and their civic engagement, including, for example, (i) their awareness of socio-political issues and motivation to follow

the news, (ii) such awareness and their self-reported ability to evaluate news stories, and (iii) their participation in civic life (e.g., through community involvement) and interest in the news. As such, findings from this project can usefully inform the design of future news literacy programmes aiming to develop not only pupils' news literacy but also their civic engagement. More specifically, they can guide both the development and evaluation of future educational interventions by shedding light on what elements of news literacy are likely to correspond to different dimensions of civic engagement in 9-11-year-olds.

6 Recommendations

Based on the studies key findings, and the discussion of them presented above, this report offers the following recommendations.

- Future research should focus on using the newly validated instruments utilised in the present study to conduct longitudinal studies that track changes in news literacy and civic engagement in 9-11-year-olds over time. This will provide valuable insights into how news literacy and civic engagement develop and evolve as children grow, and how they are influenced by various factors such as societal changes brought about by policy and new technologies, educational interventions and socio-economic background.
- Policymakers and educators should consider integrating these instruments into regular educational assessments and curricula to monitor and enhance news literacy and civic engagement from an early age. This integration can also help in tailoring educational content and teaching methods to foster news literacy and civic engagement more effectively in young learners, which is important in an era of rapid technological transformation including news written through generative AI. Furthermore, these instruments can be adapted and tested in diverse cultural contexts to understand cross-cultural similarities and differences in news literacy and civic engagement among children.
- Whilst the civic engagement measure has consistently shown strong psychometric properties across several large samples now (i.e., in the validation samples and main trial for this study), the measures of news literacy used in this research might be adapted and expanded further. It may be helpful to have a more encompassing measure of news literacy, which is a multi-faceted construct. For example, we included components such as news scepticism, vigilance, news literacy self-reports, and test of the ability to detect fake news, but other areas we did not explore include understanding of news production processes, evaluation of source credibility, recognition of journalistic standards, awareness of media bias and propaganda, understanding of the role of social media in news dissemination, and the ability to differentiate between news, advertising, and entertainment. A full large-scale psychometric analysis of the dimensions of news literacy is required before it is possible to be confident that all relevant aspects of news literacy are accounted for.

- National surveys of news literacy and civic engagement should be repeated annually to track trends over time. The benchmark data from this study may be used by future comparative studies with the aim of informing priorities for educating news literacy and for developing civic engagement in young children. Future studies could compare mean news literacy scores within schools or regions of the UK to those of the larger sample reported here.

- Researchers, educators, and civil society practitioners, both in the UK and elsewhere, could use the NewsWise programme to develop primary school children’s news literacy or take inspiration from this study with a view to designing new and/or revising existing news literacy programmes to maximising their effectiveness. Drawing on this study, researchers and practitioners implementing and evaluating NewsWise, or designing new programmes, should bear in mind that, as found by this study, NewsWise was particularly effective in developing children’s interest in the news and their ability to identify misinformation. Furthermore, it is important that funders and researchers recognise and value evidence for what does not work, as well as what does work. This extends beyond what might work as an intervention towards also recognising the practicalities of carrying out and assessing these interventions with young children, especially given schools’ competing curricular priorities and children’s general disinterest in the news. As reported by teachers, similar interventions would benefit from revisions designed to produce a more condensed version with more differentiation in terms of the design and delivery of resources for pupils with different needs.

- Given the limitations of the present study, the following considerations are recommended to researchers involved in future controlled trials of news literacy and similar educational interventions:
 - i) It is important to ensure buy-in from schools, not just individual teachers; if a teacher changes roles or goes on leave and nobody is ready to step in, this can contribute to participant attrition.
 - ii) Careful attention should be paid to the trial participants matching procedures to increase the number of pre- post- and follow up surveys that can be matched. A higher number of matches will help to maintain statistical power and ensure that statistical models are as unbiased as possible. It was emphasised in the teacher briefing that they should ensure pupils properly complete the demographic surveys to ensure their data could be matched over time, but this was not sufficient to ensure low attrition rates.
 - iii) In future, the inclusion of a teacher survey to collect precise data on the number of lessons taught would be beneficial. Seven out of twenty intervention schools submitted pupil reports to The Guardian Foundation at the end of the study, perhaps suggesting low teacher engagement. Adopting a co-production approach

to amending the NewsWise programme to ensure it fits well with other curricular demands may be a viable avenue for future research.

- iv) In terms of NewsWise, specifically, there are some initial findings here that show promise, but the findings were not unanimously positive either. Future NewsWise research might explore barriers to implementation as well as teachers' understanding of the importance of adhering to the programme so that researchers do not risk reporting false null findings.
 - v) Given that NewsWise participants' self-reported null/negative effects in the follow-up survey and positivity about the effects of Newswise in the focus groups, future research should take account of demand characteristics. Moreover, given that the objective Detecting Fake News test showed some promising positive intervention effects, it could also be the case that students simultaneously get better at detecting fake news and lose confidence in this regard due to increased knowledge of how many ways they could be deceived. This should be subject to further investigation.
- The design and evaluation of future news literacy interventions for 9–11-year-olds should be developed in ways that are grounded in the recognition that there is a positive relationship between news literacy and their civic engagement. Relatedly, we recommend that future research and interventions seeking to develop children's civic engagement could consider their development of news literacy as a crucial aspect of such interventions.
 - We recommend that policymakers build on the NewsWise study to allocate funding to support the work of civil society practitioners, educators, and researchers in terms of designing, delivering, and especially evaluating school programmes that promote news and media literacy among children.

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Appendices

Appendix A: Baseline descriptive statistics for News Literacy and Civic Engagement items – part 1.

(NOTE – there are 4 parts to this appendix as some of the items used different response scales)

Item	N.	Min	Max	Mean	SD	% out of ideal	Strongly Agree	Agree	Neither Agree nor disagree	Disagree	Strongly Disagree
I am interested in the news	1742	1	5	3.030999	1.164191	39.38002	8.553387	26.34902	32.778416	18.08266	14.23651
I often read, watch, or listen to the news	1769	1	5	2.952516	1.229183	40.94968	10.85359	31.48672	23.176936	20.52007	13.96269
I find it easy to tell if a news story is real	1635	1	5	2.615291	1.170405	47.69418	17.37003	35.10703	24.036697	15.59633	7.889908
I think about whether the news stories that I read/watch are true	1633	1	5	2.619106	1.195982	47.61788	18.73852	32.4556	26.086957	13.59461	9.124311
It is important for people to know what is happening in the world	1867	1	5	1.603107	0.774251	67.93786	53.45474	36.04713	8.194965	1.339047	0.964114
News can make a difference in the world	1740	1	5	2.344828	1.022625	53.10344	20.86207	39.88506	27.183908	8.045977	4.022989
News can make a difference in my local area	1626	1	5	2.435424	1.061539	51.29152	19.43419	37.45387	27.98278	10.3936	4.735547
I like to tell people about what is happening in my community	1698	1	5	2.810954	1.225722	43.78092	15.72438	27.8563	27.326266	17.78563	11.30742

I believe that news stories should be truthful	181 7	1	5	1.63731 4	0.84074 3	67.2537 2	54.4854 2	31.8106 8	10.23665 4	2.42157 4	1.04568
I believe that news stories should be useful for people	179 3	1	5	1.94032 3	0.87825 6	61.1935 4	33.6307 9	45.2872 3	16.00669 3	3.56943 7	1.50585 6
I believe that news stories should be fair	171 1	1	5	1.89246 1	0.86309 7	62.1507 8	36.8205 7	42.3144 4	16.83226 2	2.86382 2	1.16890 7
I believe that news stories should be balanced (tell both sides)	171 2	1	5	1.83644 9	0.88688 5	63.2710 2	41.2967 3	39.9532 7	13.90186 9	3.50467 3	1.34345 8
I believe that fake news is bad	180 8	1	5	1.68915 9	1.10657 7	66.2168 2	61.5597 4	22.3451 3	7.356195	3.09734 5	5.64159 3
I can name some trustworthy places to find news	150 0	1	5	2.55533 3	1.13697 1	48.8933 4	18.8666 7	33.4666 7	27.6	13.4	6.66666 7
I can tell the difference between fact and opinion	167 2	1	5	2.10047 8	0.96455 9	57.9904 4	28.2894 7	44.6172 2	18.30143 5	6.33971 3	2.45215 3
It is difficult to tell if information you read online is trustworthy	170 5	1	5	2.32551 3	1.07406 6	53.4897 4	23.7536 7	38.0058 7	25.04398 8	8.32844 6	4.86803 5
I know how to spot fake news	160 4	1	5	2.70511 2	1.23293 3	45.8977 6	19.0773 1	27.8678 3	26.49625 9	16.5835 4	9.97506 2
I stop, think and check facts before believing news	165 3	1	5	2.41076 8	1.19759 9	51.7846 4	25.8923 2	33.1518 5	22.62552 9	10.6473 1	7.68300 1
Two people might see the same news story and get different information from it	164 1	1	5	2.14808	0.92413 1	57.0384	23.2175 5	49.5429 6	18.82998 2	6.03290 7	2.3766
What the news says about someone can change what people think about them	168 5	1	5	2.09080 1	0.98402 4	58.1839 8	30.0890 2	42.0771 5	19.34718 1	5.63798 2	2.84866 5
News is designed to attract my attention	161 6	1	5	2.76918 3	1.22212 8	44.6163 4	16.3985 2	28.7128 7	27.41336 6	16.5222 8	10.9529 7

News reports sometimes make things more dramatic than they really are	169 1	1	5	2.01241 9	1.04914 4	59.7516 2	38.1431 1	35.5411	16.43997 6	6.68243 6	3.19337 7
I would ask my parent(s) or guardian(s) if they believe the story	175 2	1	5	2.13070 8	1.07526 3	57.3858 4	31.2214 6	41.2100 5	15.01141 6	8.39041 1	4.16666 7
I would ignore the story	168 9	1	5	2.97335 7	1.21431 6	40.5328 6	14.5056 3	20.2486 7	29.95855 5	23.9786 9	11.3084 7
I would check if the story is also reported by other sources that I trust	160 6	1	5	2.46948 9	1.25730 6	50.6102 2	25.9028 6	32.6276 5	19.36488 2	12.8269	9.27770 9
I would share the story with my friends	168 2	1	5	2.80618 3	1.31841 5	43.8763 4	18.1331 8	28.8347 2	22.53269 9	15.2794 3	15.2199 8
It is important to volunteer to help those less fortunate than me	168 8	1	5	1.72630 3	0.83250 7	65.4739 4	47.4526 1	36.3151 7	13.15165 9	2.31042 7	0.77014 2
It is important to know what is happening in the place where I live	178 2	1	5	1.76318 7	0.87375	64.7362 6	45.5106 6	38.5521 9	11.44781 1	3.08642	1.40291 8
It is important to support charities (like Children in Need)	179 7	1	5	1.50695 6	0.78219 9	69.8608 8	62.4930 4	27.9354 5	7.234279	1.05731 8	1.27991 1
Adults should vote in elections	162 2	1	5	2.06535 1	0.98558	58.6929 8	34.2786 7	33.9087 5	25.03082 6	4.56226 9	2.21948 2
Adults should follow political issues in the news	153 5	1	5	2.31726 4	1.01230 4	53.6547 2	24.1042 4	33.4202	32.05211 7	7.49185 7	2.93159 6
Adults should take part in peaceful protests	157 4	1	5	2.29860 2	1.03870 4	54.0279 6	26.5565 4	30.3049 6	33.48157 6	6.03557 8	3.62134 7
Adults should take part in activities that help people in their community	169 5	1	5	1.85604 7	0.87484	62.8790 6	40.059	39.3510 3	16.87315 6	2.35988 2	1.35693 2
Helping others makes me feel good	177 9	1	5	1.61944 9	0.81914 4	67.6110 2	53.8504 8	34.9634 6	7.925801	1.91118 6	1.34907 3
Giving time to help others is the right thing to do	177 9	1	5	1.64811 7	0.77191 4	67.0376 6	49.9718 9	38.2237 2	9.443508	1.74255 2	0.61832 5

In the future, I will try to be the kind of person who helps others whenever I can	1758	1	5	1.614334	0.827177	67.71332	55.23322	32.65074	8.703072	2.275313	1.137656
I want to feel appreciated by my community	1697	1	5	1.771361	0.913367	64.57278	47.49558	34.11903	14.142605	2.239246	2.003536
I am interested in news stories about my community	1648	1	5	2.671723	1.223791	46.56554	19.0534	28.76214	28.883495	12.56068	10.74029
I talk about politics and social issues with my parent(s) or guardian(s)	1626	1	5	3.127306	1.32706	37.45388	13.22263	22.26322	23.616236	20.3567	20.54121
If I have children, I will teach them about social and political issues	1543	1	5	2.602722	1.264262	47.94556	22.74789	27.86779	27.284511	10.56384	11.53597
I am the kind of person who helps people less fortunate than me	1654	1	5	1.936518	0.924202	61.26964	37.00121	39.48005	18.319226	3.264813	1.934704
I regularly volunteer my time for good causes	1582	1	5	2.261694	1.072656	54.76612	27.87611	34.0708	26.042984	8.027813	3.982301
I give to charity whenever I can	1650	1	5	2.131515	1.127372	57.3697	36.06061	31.51515	20.606061	6.848485	4.969697

Baseline descriptive statistics for News Literacy and Civic Engagement items – part 2.

Item	N.	Min	Max	Mean	SD	% out of ideal	Extremely Likely	Likely	Neither Likely or Unlikely	Unlikely	Extremely Unlikely
Vote in an election	1728	1	5	2.48669	1.244076	50.2662	29.282407	19.96528	31.94444	10.41667	8.3912037
Volunteer to help people	1786	1	5	1.890258	0.968415	62.19484	43.617021	31.07503	19.9888	3.303471	2.0156775

Work with my community to solve a problem where I live	1688	1	5	2.372038	1.184683	52.55924	29.976303	25	29.20616	9.478673	6.3388626
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Baseline descriptive statistics for News Literacy and Civic Engagement items – part 3.

Item	N.	Min	Max	Mean	SD	% out of ideal	Very Likely	Likely	Neither Likely or Unlikely	Unlikely	Very Unlikely
Vote in a school election of class representatives	1870	1	5	2.293583	1.34298	54.12834	36.41711	28.82353	16.09626	6.31016	12.35294
Join a group of pupils campaigning for an issue you agree with	1863	1	5	2.663983	1.334248	46.72034	22.43693	29.36125	22.32958	11.11111	14.76114
Become a candidate for class representative or school council	1865	1	5	2.47185	1.362008	50.563	33.29759	21.98391	20.16086	13.35121	11.20643
Take part in an assembly	1861	1	5	2.081677	1.262526	58.36646	45.67437	23.85814	13.97098	9.618485	6.878023
Write an article for a school newspaper or website	1859	1	5	2.957504	1.337693	40.84992	19.688	18.39699	22.59279	25.12103	14.20118

Baseline descriptive statistics for News Literacy and Civic Engagement items – part 4.

Item	N.	Min	Max	Mean	SD	% out of ideal	Often	Sometimes	Rarely	Never
I volunteer to help people in the area where I live	1706	1	4	2.296014	0.99648	42.59965	23.15358	40.1524	20.63306	16.06096

I stay informed about events happening in the area where I live	1730	1	4	2.04104	0.97795	48.974	35.4335	35.43353	18.7283	10.4046
I talk with my parent(s) or guardian(s) about stories in the news	1764	1	4	2.38832	1.11616	40.2919	27.8344	28.06122	21.5419	22.5623
I watch television to learn about the news	1794	1	4	2.64771	1.06162	33.8071	16.7781	29.82163	25.2508	28.1493
I read a newspaper to inform myself about the news	1787	1	4	3.33463	0.93681	16.6340	6.88304	12.0873	21.7123	59.3172
I talk with friends about the news	1800	1	4	2.76666	1.05634	30.8333	14.2222	27.5	25.6666	32.6111
I use the internet to find information about the news	1741	1	4	2.56519	1.12321	35.8702	22.5732	26.53647	22.6881	28.2021

Appendix B: Item-level summary analyses for differential change in News Literacy from Time 1 to Time 2.

<i>Item-level summary analyses for differential change in News Literacy from Time 1 to Time 2.</i>										
Item	Interaction t	Control T1 Mean	Control T1 SD	NewsWise T1 Mean	NewsWise T1 SD	Control T2 Mean	Control T2 SD	NewsWise T2 Mean	NewsWise T2 SD	
I am interested in the news	-2.04	3.15	1.14	2.91	1.18	3.21	1.13	2.8	1.12	
I often read, watch, or listen to the news	-0.11	3.03	1.21	2.87	1.24	3.16	1.23	3	1.22	
I find it easy to tell if a news story is real	-1.5	2.67	1.16	2.57	1.18	2.71	1.15	2.49	1.1	
I think about whether the news stories that I read/watch are true	-2.14	2.68	1.2	2.56	1.19	2.85	1.21	2.56	1.22	
It is important for people to know what is happening in the world	0.97	1.65	0.79	1.55	0.76	1.65	0.84	1.61	0.81	
News can make a difference in the world	0.01	2.44	1	2.25	1.03	2.4	1.05	2.23	1.02	

News can make a difference in my local area	-2.11	2.49	1.06	2.38	1.06	2.48	1.06	2.21	1.02
I like to tell people about what is happening in my community	0.51	2.9	1.23	2.72	1.22	2.92	1.19	2.77	1.21
I believe that news stories should be truthful	-3.16	1.91	1.28	1.87	1.33	2.01	1.44	1.69	1.23
I believe that news stories should be useful for people	-1.19	2.25	1.32	2.18	1.34	2.32	1.44	2.21	1.3
I believe that news stories should be fair	-4.39	2.4	1.51	2.29	1.53	2.48	1.63	1.94	1.31
I believe that news stories should be balanced (tell both sides)	-2.56	2.36	1.57	2.22	1.52	2.36	1.63	1.92	1.33
I believe that fake news is bad	-4.01	1.93	1.48	1.97	1.49	2.29	1.68	1.9	1.4
I can name some trustworthy places to find news	-6.93	3.32	1.74	3.29	1.75	3.41	1.76	2.56	1.58
I can tell the difference between fact and opinion	-2.93	2.6	1.55	2.58	1.6	2.72	1.7	2.38	1.5
It is difficult to tell if information you read online is trustworthy	-0.29	2.78	1.55	2.68	1.51	2.94	1.51	2.78	1.41
I know how to spot fake news	-7.17	3.26	1.64	3.21	1.67	3.43	1.73	2.56	1.47
I stop, think and check facts before believing news	-3.05	2.98	1.66	2.81	1.65	3.18	1.68	2.65	1.61
Two people might see the same news story and get different information from it	-2.79	2.18	0.92	2.11	0.93	2.11	0.98	1.86	0.78
What the news says about someone can change what people think about them	-2.8	2.13	1.01	2.06	0.96	2.2	1.7	1.91	0.93
News is designed to attract my attention	-1.54	2.82	1.21	2.71	1.23	2.87	1.2	2.62	1.16
News reports sometimes make things more dramatic than they really are	-1.24	1.99	1.03	2.03	1.06	2.1	1.06	2.04	1.01

I would ask my parent(s) or guardian(s) if they believe the story	-1.82	2.17	1.05	2.09	1.09	2.41	1.25	2.2	1.11
I would ignore the story	0.98	2.99	1.18	2.96	1.25	2.92	1.19	2.95	1.16
I would check if the story is also reported by other sources that I trust	-2.13	2.59	1.26	2.35	1.24	2.82	1.34	2.4	1.25
I would share the story with my friends	-2.31	2.88	1.32	2.73	1.31	2.95	1.3	2.86	1.28
Note. Most item-level models did not converge, pointing to the importance of developing valid and reliable multi-item psychometric measures in future research.									

Appendix C: Item-level summary analyses for differential change in News Literacy from Time 1 to Time 3.

<i>Item-level summary analyses for differential change in News Literacy from Time 1 to Time 3.</i>									
Item	Interaction t	Control T1 Mean	Control T1 SD	NewsWise T1 Mean	NewsWise T1 SD	Control T2 Mean	Control T2 SD	NewsWise T2 Mean	NewsWise T2 SD
I am interested in the news	2.34	3.15	1.14	2.91	1.18	3.09	1.13	2.99	1.11
I often read, watch, or listen to the news	2.65	3.03	1.21	2.87	1.24	3.09	1.21	3.16	1.17
I find it easy to tell if a news story is real	-1.25	2.67	1.16	2.57	1.18	2.75	1.16	2.52	1.03
I think about whether the news stories that I read/watch are true	0.01	2.68	1.2	2.56	1.19	2.79	1.26	2.66	1.24
It is important for people to know what is happening in the world	3.01	1.65	0.79	1.55	0.76	1.66	0.86	1.74	0.93
News can make a difference in the world	0.81	2.44	1	2.25	1.03	2.43	1.03	2.3	1
News can make a difference in my local area	0.49	2.49	1.06	2.38	1.06	2.48	1.06	2.4	1.07
I like to tell people about what is happening in my community	2.18	2.9	1.23	2.72	1.22	3.03	1.23	3.04	1.23
I believe that news stories should be truthful	0.01	1.91	1.28	1.87	1.33	1.6	0.87	1.57	0.81

I believe that news stories should be useful for people	0.57	2.25	1.32	2.18	1.34	1.99	0.92	1.95	0.89
I believe that news stories should be fair	1.36	2.4	1.51	2.29	1.53	1.81	0.86	1.84	0.92
I believe that news stories should be balanced (tell both sides)	0.42	2.36	1.57	2.22	1.52	1.83	0.95	1.72	0.94
I believe that fake news is bad	-0.78	1.93	1.48	1.97	1.49	1.77	1.13	1.73	1.07
I can name some trustworthy places to find news	-4.07	3.32	1.74	3.29	1.75	2.75	1.26	2.24	1.12
I can tell the difference between fact and opinion	-0.24	2.6	1.55	2.58	1.6	2.18	1.03	2.16	1.09
It is difficult to tell if information you read online is trustworthy	1.07	2.78	1.55	2.68	1.51	2.57	1.11	2.58	1.07
I know how to spot fake news	-3.57	3.26	1.64	3.21	1.67	2.76	1.25	2.33	1.12
I stop, think and check facts before believing news	0.62	2.98	1.66	2.81	1.65	2.66	1.28	2.55	1.27
Two people might see the same news story and get different information from it	0.85	2.18	0.92	2.11	0.93	2.02	0.85	2	0.91
What the news says about someone can change what people think about them	1.11	2.13	1.01	2.06	0.96	2.06	0.87	2.06	0.94
News is designed to attract my attention	1	2.82	1.21	2.71	1.23	2.74	1.24	2.73	1.2
News reports sometimes make things more dramatic than they really are	0.84	1.99	1.03	2.03	1.06	2.01	1.02	2.12	1.05
I would ask my parent(s) or guardian(s) if they believe the story	0.82	2.17	1.05	2.09	1.09	2.33	1.23	2.32	1.14
I would ignore the story	-0.54	2.99	1.18	2.96	1.25	2.91	1.23	2.82	1.15
I would check if the story is also reported by other sources that I trust	0.09	2.59	1.26	2.35	1.24	2.79	1.28	2.53	1.27
I would share the story with my friends	2.4	2.88	1.32	2.73	1.31	2.85	1.3	2.99	1.26

Note. Most item-level models did not converge, pointing to the importance of developing valid and reliable multi-item psychometric measures in future research.

Appendix D: Items for measuring news literacy and their superordinate constructs.

Table X. Items for measuring news literacy and their superordinate constructs.			
Superordinate Construct	New Construct	Question	Statement
Attitudes and Trust	News Motivation	How much do you agree with the following statements? Strongly Agree - Strongly Disagree	I am interested in the news
Attitudes and Trust	News Motivation	How much do you agree with the following statements? Strongly Agree - Strongly Disagree	I often read, watch, or listen to the news
Evaluation Skills and Strategies	News Evaluation Self Report	How much do you agree with the following statements? Strongly Agree - Strongly Disagree	I find it easy to tell if a news story is real
Evaluation Skills and Strategies	News Evaluation Self Report	How much do you agree with the following statements? Strongly Agree - Strongly Disagree	I think about whether the news stories that I read/watch are true
Attitudes and Trust	News Motivation	How much do you agree with the following statements? Strongly Agree - Strongly Disagree	It is important for people to know what is happening in the world
Attitudes and Trust	News Motivation	How much do you agree with the following statements? Strongly Agree - Strongly Disagree	News can make a difference in the world

Attitudes and Trust	News Motivation	How much do you agree with the following statements? Strongly Agree - Strongly Disagree	News can make a difference in my local area
Attitudes and Trust	News Motivation	How much do you agree with the following statements? Strongly Agree - Strongly Disagree	I like to tell people about what is happening in my community
Attitudes and Trust	News Attitudes	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	I believe that news stories should be truthful
Attitudes and Trust	News Attitudes	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	I believe that news stories should be useful for people
Attitudes and Trust	News Attitudes	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	I believe that news stories should be fair
Attitudes and Trust	News Attitudes	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	I believe that news stories should be balanced (tell both sides)
Attitudes and Trust	News Attitudes	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	I believe that fake news is bad
Evaluation Skills and Strategies	News Evaluation Self Report	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	I can name some trustworthy places to find news

Evaluation Skills and Strategies	News Evaluation Self Report	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	I can tell the difference between fact and opinion
Evaluation Skills and Strategies	News Evaluation Self Report	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	It is difficult to tell if information you read online is trustworthy
Evaluation Skills and Strategies	News Evaluation Self Report	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	I know how to spot fake news
Evaluation Skills and Strategies	News Evaluation Self Report	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	I stop, think and check facts before believing news
Knowledge	Knowledge of News Production and Consumption	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	Two people might see the same news story and get different information from it
Knowledge	Knowledge of News Production and Consumption	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	What the news says about someone can change what people think about them
Knowledge	Knowledge of News Production and Consumption	Here are some things people have said about the news. How much do you agree or disagree with them? Strongly Agree - Strongly Disagree	News is designed to attract my attention
Knowledge	Knowledge of News Production and Consumption	Here are some things people have said about the news. How much do you	News reports sometimes make things more dramatic than they really are

		agree or disagree with them? Strongly Agree - Strongly Disagree	
Evaluation Skills and Strategies	News Vigilance	What would you do if you saw a news story that you thought might not be true? Strongly Agree - Strongly Disagree	I would ask my parent(s) or guardian(s) if they believe the story
Evaluation Skills and Strategies	News Vigilance	What would you do if you saw a news story that you thought might not be true? Strongly Agree - Strongly Disagree	I would ignore the story
Evaluation Skills and Strategies	News Vigilance	What would you do if you saw a news story that you thought might not be true? Strongly Agree - Strongly Disagree	I would check if the story is also reported by other sources (e.g., website/TV) that I trust
Evaluation Skills and Strategies	News Vigilance	What would you do if you saw a news story that you thought might not be true? Strongly Agree - Strongly Disagree	I would share the story with my friends
Note. This hierarchical model showed excellent fit to the data with CFI and TLI > .95			