

What You Read in Newspapers Matters: The Contribution of Press Portrayals to Attitudes Toward Autism.

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Abstract

Background: Newspapers frequently portray autism negatively and stereotypically, with such portrayals being particularly prevalent in certain tabloids and right-leaning publications. Negative coverage can harm the well-being of autistic people and hinder their acceptance within society. This study further examined the impact of newspaper coverage by analysing the relationship between readers' newspaper preferences and trust in different outlets and their attitudes towards autism.

Method: In an online survey, we recruited 277 UK-based, non-autistic adults who provided demographic information, reading frequency data, and trustworthiness ratings for 10 British newspapers. Participants also completed questionnaires on their knowledge about autism, their explicit attitudes, and a task assessing implicit attitudes toward autism. Data were analysed using generalised additive models weighted by overall exposure to newspapers, with explicit and implicit attitudes as outcome variables. A hierarchical partitioning analysis determined the proportion of the variance in explicit and implicit attitudes explained by reading behaviour and other variables.

Results: Our analyses accounted for 60.1% of the variance in explicit (adjusted- $R^2 = 0.60$) and 35.2% in implicit attitudes, with reading behaviour variables collectively explaining 6.0% of the variance in explicit and 10.4% in implicit attitudes. Crucially, a preference for reading right-leaning tabloids predicted more negative implicit attitudes. Furthermore, participants with selective trust in right-leaning tabloids tended to have relatively favourable explicit but relatively unfavourable implicit attitudes. A complementary analysis suggested that participants with higher overall trust in newspapers had less accurate knowledge about autism.

Conclusion:

Our findings highlight the role of the quality of newspaper content in influencing readers' explicit and implicit attitudes toward autism, alongside other factors. Trust in and engagement with content that negatively and stereotypically portrays autism appear to reinforce negative implicit biases, even when explicit attitudes are favourable. Future research should investigate broader media ecosystems and causal pathways underlying attitudinal shifts.

Introduction

Throughout their lives, autistic people frequently encounter challenges and adverse outcomes in education, employment, social life, and physical and mental health.¹⁻¹⁷ Increasingly, these outcomes are understood to arise not from characteristics inherent to autistic people^{18, 19} but rather from inadequate accommodations in the environment, with a lack of acceptance and negative attitudes toward autism magnifying their frequency, severity, and impact.²⁰⁻²⁴ A growing body of research investigates a wide range of factors, both intrinsic (e.g., age, gender, personal experiences) and environmental (e.g., culture), which may shape attitudes toward autism and impact the acceptance of autistic people in society.²⁵⁻³⁰

The present study examines an additional environmental factor: media representations of autism, particularly in newspapers. Such representations not only reflect but also actively shape public perceptions of autism. When coverage is negative and reinforces stereotypes, it can hinder acceptance and the transition to more inclusive societies.^{31, 32} Therefore, this study investigates how much exposure to specific newspaper content contributes to readers' attitudes toward autism, while also considering several other factors known to influence such attitudes. This research demonstrates the broader societal implications of creating or engaging with content about autism in news media³³⁻³⁵ — knowledge that is useful to anyone interested in autism acceptance and the fostering of more inclusive societies.

Autism-related Adversities and the Role of Acceptance

Extensive research shows that autistic people — 1% to 3% of the population^{36, 37} — face negative outcomes in their education, employment, social life, and physical and mental health. Autistic people are at increased risk of bullying,^{1, 2} more likely to be excluded from school,³ and frequently encounter social exclusion at university.^{4-6, 38} After graduation, they often struggle with high unemployment rates and limited access to competitive employment.¹⁰ In terms of mental well-being, autistic people experience mental health conditions at rates up to four times higher than neurotypical people.⁷⁻¹⁰

Historically, these adversities faced by autistic people were primarily understood in terms of innate “deficits,” “difficulties,” or “atypicalities” in areas defining autism in clinical terms, such as communication and social interaction.^{18, 19} More recent society-based perspectives, however, recognise that many of these challenges stem from educational, professional, and social environments that fail to provide the necessary adaptations and support.²²⁻²⁴ While autism includes disabling aspects, their impact is magnified when inadequate accommodations prevent autistic people from thriving.^{20, 23}

Within this newer framework, even though social difficulties are central to autism, they can be more accurately seen as relational, shaped by interactions between autistic people and the neurotypical majority.^{21, 23} Thus, improving societal acceptance emerges as a catalyst for improved life outcomes for autistic people. Conversely, a lack of acceptance perpetuates harmful stereotypes (defined as commonly held but often inaccurate beliefs)³⁹ and stigma (described as a mixture of negative perceptions and social disapproval).⁴⁰ This drives exclusionary practices that weaken self-acceptance and fuel internalised stigma amongst autistic people,²⁰ and encourage masking behaviours that worsen their mental health.^{17, 41} As a result, poor acceptance leads to poorer mental well-being, which then reinforces exclusion and adversity, creating a self-perpetuating cycle.^{11-13, 15-17, 41}

Attitudes Toward Autistic People and Influencing Factors

Central to the cycle of acceptance and adversity are attitudes toward autism, which shape how autistic people are perceived and treated, and can be explicit or implicit. Explicit attitudes develop consciously over time, usually reflecting cultural norms and acquired knowledge.⁴² In contrast, implicit attitudes arise automatically and unconsciously and reflect entrenched biases that resist conscious change.⁴²⁻⁴⁴ While explicit attitudes may appear supportive, implicit attitudes guide spontaneous, subconscious behaviours.^{45, 46} Crucially, explicit attitudes toward autism can be more favourable than implicit ones, indicating how covert biases undermine public expressions of acceptance.⁴⁵ However, evidence on the relationship between explicit and implicit attitudes remains mixed: some studies found no association,^{26, 45} whereas others^{27, 28} report a strong link.

A growing body of research examines factors that shape attitudes toward autism. For a comprehensive review of 47 such studies (36 of which were subjected to a meta-analysis), see Kim and colleagues.²⁵ This literature has examined both intrinsic and environmental factors. Intrinsic factors refer to personal attributes or characteristics. Much attention has focused on demographics, such as gender, age, education, as well as knowledge about autism. Some studies suggest that women,^{29, 47, 48} younger adults,⁴⁹ and individuals with higher education levels^{50, 51} may hold more favourable attitudes toward autism. Yet, the meta-analysis of Kim and colleagues²⁵ identified gender as the only consistent demographic predictor; other research finds no significant effects of gender,^{38, 44, 46, 47} age,^{26, 52, 53} or education⁵² on implicit attitudes.

Another intrinsic factor is specific knowledge about autism, gained through specialised training, personal study, or accessing autism-awareness campaigns.^{29, 50, 54} Such knowledge is associated with reducing stigma and dispelling misconceptions, as well as challenging harmful causal attributions about disability.⁴⁹ Many studies link higher levels of autism knowledge with more positive explicit attitudes.^{26, 27, 29, 52, 55, 56} However, other studies do not replicate this effect,^{49, 57} while a few studies show no significant effect of autism knowledge on implicit attitudes,^{50, 58} implying that some deeply entrenched biases persist despite greater awareness.

Environmental factors include external influences, such as culture and interpersonal interactions. For instance, people in Western cultures display more positive attitudes toward autism than those in some Eastern or Asian contexts,^{27, 28, 59} though cross-cultural differences remain understudied in meta-analyses like Kim et al.²⁵ An additional environmental factor is contact with autistic people. Consistent with the intergroup contact theory,^{25, 60} positive interactions with members from different groups reduce prejudice and improve both explicit and implicit attitudes.^{43, 61, 62} The quality of these interactions matters, as sustained, constructive engagement fosters empathy and greater understanding, whereas superficial or negative encounters may reinforce harmful stereotypes toward autistic people.^{61, 63}

Newspaper Portrayals and Attitudes Toward Autism

An alternative, relatively unexplored, environmental factor, which influences attitudes toward autism is media representations,⁶⁴ including fictional media,⁶⁵⁻⁶⁷ news media,^{33, 67} and, increasingly

involving social media.⁶⁸ News media, in particular, both reflect and shape public attitudes toward marginalised groups, including autistic people. Through agenda-setting as well as language and framing, news outlets prioritise certain stories and highlight specific aspects of autism, subtly influencing public perceptions.⁶⁹⁻⁷¹ Regarding newspapers, several studies have demonstrated how they often portray autism inaccurately, reinforcing ableist and stereotypical views.^{31, 33, 67, 72, 73} or misrepresenting autism as primarily associated with children—especially boys.^{31, 32, 74, 75}

A recent large-scale study by Karaminis and colleagues³¹ systematically analysed representations of autism in ten British newspapers over a decade, charting shifts over time and identifying differences between broadsheets and tabloids, as well as between left- and right-leaning papers. Their findings indicated gradual progress: media coverage of autism increased steadily, slowly shifting from deficit-focused views to perspectives emphasizing difference. This slow progress seemed to be less easily observable in tabloids and right-leaning papers, in which references to autism were more scarce than in left-leaning broadsheets. Furthermore, coverage in right-leaning tabloids seemed to be more often negative and deficit-oriented — focusing on specific individuals, celebrities, or fictional characters, rather than providing nuanced and non-stigmatising descriptions of the autistic experience.

Despite extensive research on autism representation in news media, relatively little is known about how much these portrayals influence public understanding of autism. There is evidence that press coverage influences public attitudes,^{34, 76} and that these effects are proportional to exposure.^{77, 78} However, these effects are unlikely to flow in a simple, one-directional manner. Public opinion interacts with media messages through intricate, bidirectional processes—both conscious and unconscious.^{77, 78} Readers filter or interpret information based on preexisting beliefs, whilst engaging with multiple media sources that might reinforce or challenge their views toward autism. Many people select outlets that align with their own perspectives, thus solidifying, rather than altering, established opinions.⁷⁹ This is relevant to the recent notion of echo chambers— describing enclosed social and online environments where people gravitate toward interactions and content that predominantly reinforces their preexisting biases.⁸⁰

Finally, there are likely considerable individual differences in how press representations affect attitudes. Factors shaping implicit and explicit attitudes toward autism—such as demographic characteristics, contact with autistic people, and autism knowledge— might affect how individuals perceive and interpret news stories. For instance, certain groups might present preferences to read specific news outlets or respond differently to news stories depending on their beliefs and familiarity with autistic people.

The Current Study

This study aims to explore how engagement with newspaper content influences both explicit and implicit attitudes toward autism. To this end, we administered a survey to participants recruited through an online platform. The survey recorded comprehensive measures of participants' newspaper reading habits and trust in specific newspapers and assessed their explicit and implicit attitudes toward autistic people. It also recorded a variety other variables previously linked to attitudes toward autism.²⁵

We hypothesised that participants' reading behaviour and trust preferences, particularly with respect to the contrast between right-leaning tabloids and left-leaning broadsheets, will be reflected in their attitudes towards autism, consistent with the quality of autism coverage in these segments of the press.³¹ In addition, we anticipated factors such as age, gender, contact with autistic people, or knowledge about autism to also influence attitudes in line with existing literature.²⁵

We also aimed to establish the relative contribution of reading preferences and trust in individual newspapers alongside the variety of factors shaping autism attitudes. To this end, we used statistical methods that determined the portion of the explained variance in explicit and implicit attitudes explained by each factor. Finally, in a complementary post hoc analysis, we examined how much newspaper reading preferences shape participants' knowledge about autism, given that such knowledge consistently emerged as one of the most influential predictors of explicit and implicit attitudes toward autism.

Methods

Participants

A total of 277 participants (180 identifying as “female,” 96 “male,” and 1 “other”) completed the study. Participants were recruited through the Prolific platform (www.prolific.co) and were compensated pro rata for their time. Eligibility criteria included being over 18 years old, residing in the UK, not being autistic, and having access to a computer with a physical keyboard (required for the part of the survey assessing implicit attitudes). Participant demographics are shown in Table 1.

An additional 45 participants began the survey without completing it and were excluded from the analysis. Furthermore, 21 participants were excluded due to failing in at least one of two attention-check questions, included in the online survey to mitigate poor-quality responses.⁸¹

Survey

All participants completed an online survey, which they accessed through the Qualtrics platform (www.qualtrics.com). The survey included the following six sections.

Demographics

Participants began by answering four demographic questions. They selected their age group from six ranges (18–24, 25–34, 35–44, 45–54, 55–64, 65 and older), their gender (“Female,” “Male” or “Other”), and their highest completed education level (GCSE or lower, A-Levels or equivalent, Certificate, Diploma or Foundation Degree, Bachelor’s Degree, Master’s Degree, or PhD/Professional Doctorate). Additionally, participants indicated their political leanings, choosing from six options: “Left,” “Left-leaning,” “Centre,” “Right-leaning,” “Right,” “Other”, and “Prefer not to say”.

Contact with Autistic People

Participants were asked to report their level of contact with autistic people by responding to the question: “Do you know and regularly spend time with someone who is autistic?” The

response options included: "No, I don't know anyone who is autistic," "Yes, I know someone who is autistic, but I don't spend time with them," "Yes, I know someone who is autistic, but I only spend time with them infrequently," and "Yes, I know someone who is autistic and spend time with them often or regularly."

Newspaper Reading Preferences and Perceived Trustworthiness

Next, participants were asked about their reading habits and perceptions of 10 prominent British newspapers (*Daily Express, Daily Mail, Daily Mirror, Daily Star, Daily Telegraph, The Guardian, The Independent, The Observer, The Sun, and The Times*). For each newspaper, participants indicated their reading frequency using five options: "Never", "A few times a year," "A few times a month," "A few times a week," and "Daily." Additionally, they rated the trustworthiness of each newspaper on a 5-point Likert scale, ranging from "Not trustworthy" to "Very trustworthy".

Single-Category Implicit Association Test

Participants were subsequently invited to "complete a word-based game in which [they should] assign words to categories". More specifically, they completed a Single-Category Implicit Association Test (SC-IAT),⁸² a computerised experiment which is often used to assess implicit attitudes toward a concept. This task was implemented within the Qualtrics survey, using the *iatgen* platform (<http://iatgen.org>) and the *iatgen*⁸³ R package.

Broadly speaking, the SC-IAT assesses implicit attitudes by measuring how quickly participants categorise words related to a target concept, in our case, autism, as either positive or negative. The SC-IAT comprises two stages. In the first stage, participants are prompted to categorise autism-related words together in a given type of evaluation, for example, positive. In the second stage, participants are prompted to categorise the same words in the opposite type of evaluation, negative. The response times, or categorisation latencies, are used to determine the extent to which participants associate the target concept more strongly with one evaluation over the other, positive over negative or vice-versa. Faster response times indicate a stronger implicit association in the same direction.

The SC-IAT outcome is the D-score, which quantifies the strength and direction of implicit attitudes. D-scores between -2.00 and -0.16 suggest negative implicit attitudes, D-scores from -0.15 to $+0.15$ indicate neutral attitudes and D-scores between $+0.16$ and $+2.00$ reflect positive implicit attitudes.^{26, 45, 82}

Our autism-related SC-IAT used autism-relevant stimuli from Cage and Doyle,²⁶ namely the words "Autistic," "Asperger's," "Spectrum," "ASD," and "Neurodivergent". Positive evaluative words included terms like "wonderful," "friendly," and "happy," while negative evaluative words included terms such as "horrible," "angry," and "tragic."²⁶ Participants completed five blocks of trials. The first block introduced the task and allowed participants to practice categorising words. The second and third blocks formed the first stage of the SC-IAT, where participants categorised autism-related words with one evaluation. The fourth and fifth blocks constituted the second stage, where the opposite evaluation was applied. The between-block reliability was good in our data with Cronbach's $\alpha = 0.82$. For a more in-depth description of the SC-IAT analysis, see Supplementary Material S1.

The Societal Attitudes Towards Autism Scale.

Following the SC-IAT, participants completed the Societal Attitudes Towards Autism Scale (SATA),⁸⁴ a 16-item questionnaire developed to evaluate explicit attitudes toward autism and autistic people. This scale includes statements designed to capture stereotypes and biases, such as, "People with autism should not engage in romantic relationships." Participants rated their agreement with each statement on a 4-point Likert scale, ranging from "Strongly disagree" to "Strongly agree". Higher overall scores in this scale indicate more favourable views toward autism. In the current study, the SATA scale demonstrated good internal consistency, with Cronbach's $\alpha = 0.84$.

Autism Awareness Scale

Finally, participants' knowledge of autism was assessed using the Autism Awareness Scale (AAS).^{29, 85} This scale consists of 13 items with statements such as, "Autism is more frequently diagnosed in males than females." Participants rated their agreement with each statement on a

5-point Likert scale, ranging from “strongly disagree” to “strongly agree”. A higher score in this scale indicates greater accuracy in knowledge about autism. In this study, the AAS demonstrated acceptable internal consistency, with a Cronbach’s alpha (α) of 0.77.

General Procedure and Ethics

This research was approved by the Science Research Ethics Committee of Edge Hill University (ScREC: ETH2021-0341) and conducted in accordance with its ethical guidelines. Participants accessed the survey via the Prolific platform and were presented with an information sheet explaining the study’s focus on autism-related beliefs and everyday life. The role of newspaper reading preferences was not disclosed at this stage. Informed consent was obtained before participants proceeded to the survey, which took approximately 15–20 minutes to complete. Two attention-check questions,⁸¹ instructing responses of “strongly agree” and “strongly disagree,” were included within the SATA and AAS scales. At the end, participants were redirected to a debriefing page with further details about the study.

Community Involvement

Every stage of this research—including the design of the study, analysis of results, interpretation of findings, and the authoring of this paper—was a collaborative effort between an autistic and a non-autistic researcher.

Data Preprocessing and Measurements

Data were preprocessed by scoring the three questionnaires following their respective guidelines. Non-standardised responses (e.g., age, education, contact with autistic people) were converted into numeric values, with age ranges mapped to a linear scale and education levels approximated as years of education. Gender was treated as a factor with three levels (“Male,” “Female,” and “Other”). Political orientation was also treated as a factor, so as to include participants who responded “Other” and “Prefer not to say” to this question (rather than on the five-point scale between “Right” and “Left” political views). SC-IAT D-scores were computed following Greenwald’s revised algorithm,⁸⁴ which suggested the exclusion of 56 trials (around 0.001% of total), with response times < 400ms, in our data, but no participants due to an

elevated rate of trials with a response time < 300ms (see Supplementary Materials S1 for further details).

Reading behaviour and trust ratings were coded numerically. Reading frequency responses for each newspaper underwent a quadratic transformation to better correspond to the actual frequency of exposure to a given newspaper. Further details on reading behaviour measures are provided in Supplementary Materials S2.

From the transformed reading behaviour data, two primary measures of reading behaviour were derived:

1. **Overall Exposure to Newspapers:** This measure was the summed reading frequency across all newspapers. It could range from no engagement at a score of 0 up to 160, corresponding to exposure to every one of the 10 newspapers on a daily basis.
2. **Selective Exposure to Newspapers (Reading Preference for Right-Leaning Tabloids).** This measure was the difference between the reading frequency of the four right-leaning tabloids (*Daily Express*, *Daily Mail*, *Daily Star*, and *The Sun*) minus the reading frequency of the three left-leaning broadsheets (*The Guardian*, *The Independent*, *The Observer*). It was higher when participants answered they read more frequently right-leaning tabloids. This measure could range from -48, corresponding to daily exposure to each one of the left-leaning broadsheets and no exposure to right-leaning tabloids, up to 64, corresponding to daily exposure to each of the four right-leaning tabloids and no exposure to left-leaning broadsheets.

Similarly, two metrics were calculated for trust: **Overall Trust** (the mean trust rating across all newspapers, potential range of 0 to 40) and **Selective Trust** (the difference between trust ratings of right-leaning tabloids minus left-leaning broadsheets, potential range of -12 to 16).

Main Data Analyses

Generalised Additive Models and Weighting

Our main analysis used regression models in which explicit or implicit attitudes were the outcome variables, and all other measurements, i.e., demographics, contact with autistic people, autism knowledge, implicit or explicit attitudes (correspondingly), and measurements related to newspaper reading and trust, were predictors. We modelled the data non-parametrically with generalised additive models (GAMs) using the *mgcv* package in R.⁸⁶ GAMs were selected because they offer a flexible framework for regression problems, which allows for nonlinear patterns in the effects of predictors and does not rely on strict parametric assumptions.⁸⁶

In the GAM models, data were weighted by overall exposure to newspapers, meaning that data from participants who read newspapers very frequently were given more importance than data from participants who read newspapers infrequently or never. This weighting was deemed necessary as an initial descriptive analysis showed considerable variation in participants' overall exposure to newspapers, with 19.86% reporting they did not read newspapers at all and many of them reporting they read them only infrequently (Supplementary Materials S3). Weighting mitigated the impact of this variability in overall exposure to newspapers on the understanding of the relationship between selective reading preferences and attitudes toward autism. To assess how much weighting increased the explained variance by the GAMs we considered "baseline" unweighted versions of the GAM models (Supplementary Materials S7-S9). Furthermore, we established that an alternative analysis applying unweighted GAMs to a reduced dataset, obtained after excluding participants with minimal exposure to newspapers, yielded similar results (see Supplementary Materials S10-S12).

Hierarchical Partitioning

Additionally, we carried out a hierarchical partitioning analysis of the weighted GAMs using the *gam.hp*⁸⁷ package in R. This analysis identified the relative contribution of each predictor in the outcome variables or, in other words, the percentage of the variance in the outcome variable a given predictor explained. Hierarchical partitioning was applied given that our GAM regression

models included several predictors, some of which were strongly associated with other predictors.^{86, 87} For example, knowledge about autism was positively associated with contact with autistic people ($r_s = 0.37, p < 0.001$), and years of education was negatively associated with selective reading preference for right-leaning tabloids ($r_s = -0.31, p < 0.001$) (see Supplementary Materials S3). These associations, referred to as collinearities or, in the case of non-linear GAMs, concurvities, are thought to challenge the interpretation of regression models because they imply that some predictors may share explained variance in the outcome variable with other predictors while, in some cases, they may alter the relationship of other predictors with the outcome variable (suppressor effects).^{86, 88-90}

The hierarchical partitioning approach addresses all these issues and provides an intuitive interpretation of complex regression models based on the notion of the individual contribution of each factor in the explained variance using the adjusted R^2 measure. Crucially, this measure penalises complexity, meaning it is negative for predictors that increase the complexity of GAM models without improving their explanatory power. In our analysis, such predictors, assigned negative adjusted R^2 , were deemed as having zero contribution to the explained variance. For an alternative analysis based on a model selection procedure where predictors were iteratively excluded based on measures of collinearity and concurvity, see Supplementary Materials S12-S15.

Post-hoc Analysis of Knowledge about Autism

Finally, given that knowledge about autism emerged as an influential predictor of explicit and implicit attitudes, we carried out a complementary analysis focusing on the relative contributions of reading behaviour and trust in explaining variance in autism knowledge. This additional investigation was intended to clarify how media consumption potentially influences a person's knowledge about autism.

Results

Explicit Attitudes

As shown in Figure 1A (see also Supplementary Materials S4), the GAM model weighted by overall exposure to newspapers accounted for 60.1% of the variance in explicit attitudes as measured with the SATA (mean = 56.38; standard deviation, SD = 5.33; see Supplementary Table 1). This was 21.5% higher than a corresponding unweighted baseline model treating all data equally (Supplementary Materials S7).

The largest contribution to explained variance came from autism knowledge, accounting for 35.6% through a highly significant non-linear effect ($p < 0.001$), where greater knowledge generally corresponded to more positive explicit attitudes. Implicit attitudes also contributed 8.6% of explained variance via a significant non-linear effect ($p < 0.001$), with explicit attitudes improving alongside more positive implicit attitudes, though showing a slight decline for participants with the highest implicit attitudes.

Reading behaviour variables

Predictors related to newspaper reading behaviour collectively explained 6.0% of the variance in explicit attitudes, a notable increase from 0.3% in the unweighted baseline model (Supplementary Materials S7). Reading preferences for tabloids (Figure 1C) accounted for 1.5% of the variance but were not a significant predictor in the GAM model ($p = 0.10$). In contrast, trust preferences (Figure 1D) were significant ($p = 0.005$), contributing 2.9% of the variance, with a non-linear effect indicating that individuals who placed greater trust in right-leaning tabloids tended to exhibit more positive explicit attitudes toward autism. Finally, overall trust in newspapers (Figure 1E) accounted for 1.5% of the variance but was not a significant predictor ($p = 0.11$).

Other factors

Several other predictors unrelated to reading behaviour were significant in the weighted GAM model but contributed relatively little to the explained variance. Age had the highest

contribution (3.6%, $p = 0.03$), following an inverted-U pattern where middle-aged participants displayed the most positive explicit attitudes. Political beliefs contributed 3.0%, with pairwise contrasts suggesting that left-leaning participants showed significantly more positive attitudes toward autism than participants with right views ($ps < 0.001$). Contact with autistic people (2.4%, $p < 0.001$) exhibited a linear effect, where unexpectedly, closer contact was associated with worse explicit attitudes. Gender accounted for 0.5%, with males exhibiting more favourable explicit attitudes than females ($p < 0.001$). Finally, years of education contributed 0.4% ($p = 0.008$), with higher educational attainment associated, unexpectedly, with worse explicit attitudes.

Implicit Attitudes

As shown in Figure 2A (see also Supplementary Materials S5), the GAM model weighted by overall newspaper exposure explained 35.2% of the variance in implicit attitudes as measured with D-Scores, which were on average neutral for our participants (Mean = 0.157, SD = 0.15; see Supplementary Table 1). This represented a 20.1% increase in explained variance compared to the unweighted baseline model (Supplementary Materials S8).

The largest contributor to the explained variance in implicit attitudes was participants' explicit attitudes towards autism, which accounted for 10.2% of the variance in implicit attitudes via a highly significant ($p < 0.001$) and followed a non-linear pattern where better explicit attitudes generally corresponded to more positive implicit attitudes. Knowledge about autism also played a notable role, explaining 5.9% of the variance in implicit attitudes, through a significant non-linear pattern ($p < 0.001$) where, unexpectedly, participants with higher AAS scores tended to present less favourable implicit attitudes.

Reading behaviour variables

Reading behaviour variables collectively explained 10.4% of the variance in implicit attitudes, compared to 2.6% in the unweighted baseline model (Supplementary Materials S8). Reading preferences for right-leaning tabloids (Figure 2B) contributed a 4.3% of explained variance through a highly significant linear effect ($p < 0.001$), where greater exposure to these

newspapers was associated with worse implicit attitudes. Trust preferences (Figure 2C) contributed an additional 2.7% through a significant non-linear effect ($p = 0.002$), with participants holding neutral trust preferences showing the most favourable implicit attitudes, while those with the highest trust in right-leaning tabloids exhibited the least favourable implicit attitudes. In contrast, overall trust in newspapers (Figure 2E) explained 3.4% of the variance but was not a significant predictor of implicit attitudes ($p = 0.31$).

Other factors

Among other significant predictors, political orientation accounted for 4.6% of the variance in implicit attitudes, with implicit attitudes becoming more negative as views shifted further to the right ($ps < 0.003$). Gender contributed 0.9% to the variance, with males exhibiting less favourable implicit attitudes than females ($p = 0.02$).

Knowledge about Autism

In the post-hoc analysis of contributions to knowledge about autism (Figure 2; see also Supplementary Materials S6), the weighted GAM model accounted for 72.3% of the variance in knowledge—22.3% more than the unweighted reference model (Supplementary Materials S9). In the weighted model, explicit attitudes were the largest contributor, accounting for 28.3% of the variance and serving as a highly significant predictor ($p < 0.001$). This effect was nearly linear, with better explicit attitudes corresponding to better autism knowledge. Closer contact with autistic people also significantly predicted greater knowledge in a non-linear pattern (individual contribution = 12.9%; $p < 0.001$). Political views contributed 10.1% to the explained variance, with pairwise comparisons indicating that more left-leaning participants had more accurate knowledge ($p < 0.001$). Gender accounted for 1.0% of the variance, with males showing less accurate knowledge than females ($p < 0.001$). Education contributed 6.9%, following a linear effect where higher educational attainment was associated with more accurate knowledge ($p = 0.01$).

Reading behaviour variables

Variables related to reading behaviour collectively explained 11.1% of the variance in knowledge (compared to 2.1% in the unweighted baseline model, Supplementary Materials S9). Reading preferences (Figure 3B) contributed 4.8% through a significant non-linear effect, where knowledge about autism seemed to sharply increase for some participants with strong preferences for tabloids ($p = 0.03$). Trust in right-leaning tabloids (Figure 3C) accounted for 4.2% of the variance but was not significant ($p = 0.28$). In contrast, overall trust in newspapers explained 2.2% of the variance through a highly significant non-linear effect ($p = 0.005$), where higher overall trust was associated with less accurate knowledge about autism.

Discussion

This study investigated the influence of press representations of autism on non-autistic individuals' explicit and implicit attitudes toward autistic people. We focused on participants' newspaper reading behaviours, particularly their selective engagement with and trust in right-leaning tabloids—outlets that refer to autism relatively infrequently yet often feature stereotypical, stigmatising, and sensationalistic portrayals, especially when compared to left-leaning broadsheets.³¹ However, we do not claim that stigmatising representations are exclusive to these outlets (right-leaning tabloids). Ample evidence suggests that negative or deficit-focused portrayals are pervasive in newspapers and other media.^{31-33, 67, 72-74, 88, 89} Moreover, a recent participatory study found that autistic people perceived only minor differences in sentiments about autism across various newspapers.⁹⁰

When examining participants' reading behaviour, we differentiated between reading frequency and trust in right-leaning tabloids versus left-leaning broadsheets, as well as overall exposure to and trust in UK newspapers. These variables consistently emerged as reliable predictors of explicit and implicit attitudes, albeit in distinct ways. Notably, a preference for reading right-leaning tabloids predicted implicit attitudes only, demonstrating a robust linear effect where such preferences were associated with more negative biases. In contrast, trust in right-leaning tabloids predicted both explicit and implicit attitudes through more complex

non-linear effects: participants who placed the highest trust in these outlets expressed relatively favourable explicit attitudes but exhibited relatively unfavourable implicit attitudes.

These contrasting patterns suggest that social desirability concerns may influence explicit responses, whereas implicit attitudes, being more automatic, are less prone to conscious modification. Our findings indicate that social desirability may be particularly pronounced among participants who trust right-leaning tabloids. One explanation is that these individuals might be more influenced by the emotive framing and socially normative narratives prevalent in such outlets,⁹¹⁻⁹³ leading them to report positive explicit attitudes while harbouring negative implicit biases. Alternatively, this pattern aligns with models proposing that media-driven stereotypes initially shape implicit attitudes, which subsequently influence explicit attitudes.⁷⁷ Under this view, implicit attitudes represent an earlier stage in the causal pathway and are thus more directly affected by newspaper reading preferences.

Nevertheless, this core pathway is likely part of a broader system with dynamic and cyclical interactions over time, which enable press and media representations of autism to progressively shape public perceptions and social reality, consistent with cultivation theory.^{77, 78} A central tenet of the cultivation theory is that media effects scale with exposure. Our findings underscore this principle while highlighting the complexity of how multiple facets of media engagement—reading preferences, trust preferences, and overall exposure (as accounted for in the weighted GAM models)—jointly contribute to these outcomes.

In this study, we examined how reading preferences influence attitudes toward autism alongside other factors known to shape implicit and explicit attitudes²⁵—and which may also affect participants' reading behaviours.⁷⁹ For instance, individuals with left-leaning political views often prefer left-leaning broadsheets, a pattern also observed in our data. Even after accounting for several influential variables with potential overlaps between them, reading behaviour emerged as a reliable predictor of both explicit and implicit attitudes. This finding underscores the robustness of these effects and highlights the importance of considering multiple predictors to gain a comprehensive understanding of how attitudes develop.

Moreover, our analysis explained a substantial portion of variance in the outcome variables—about 60% for explicit attitudes and roughly 35% for implicit attitudes, suggesting the importance of incorporating media exposure and public discourse in research studies aiming to understand how attitudes are formed. Nevertheless, a considerable share of variance in both explicit and implicit attitudes remains unaccounted for, reflecting the complexity of human behaviour, which is shaped by numerous interrelated factors. This is particularly evident for implicit attitudes, which are often deeply ingrained, poorly understood, and resistant to change.^{29, 30, 42, 44-46}

The post-hoc analysis of knowledge about autism accounted for more than 70% of the variance in that measure and, again, suggested the involvement of factors related to newspaper consumption. Notably, the more participants trusted newspapers the less accurate their knowledge about autism was, suggesting that adopting a critical stance may be key to learning about autism.

Implications for the Improvement of Attitudes toward Autistic People

Taken together, our findings suggest that the quality of the representation of autism in newspapers is an important factor in the construction of implicit and explicit attitudes toward autism. As a result, media outlets may create either a “virtuous circle,” where respectful and informed coverage promotes more favourable attitudes, or a “vicious circle,” where sensationalistic, stereotypical representations reinforce stigma.⁹⁴ These insights have clear implications for editors, journalists, and other media contributors, as well as for readers.

Editors, journalists, and media professionals can foster more positive attitudes by producing content that reflects the lived experiences of autistic people and promotes nuanced, strengths-based perspectives. Autistic advocates, community leaders, and media professionals—including autistic journalists—are especially well-positioned to drive these changes. Their involvement can guide news outlets toward more empathic, inclusive reporting, ultimately advancing societal acceptance.

Readers may also play a vital role by approaching autism coverage with a critical eye—questioning sensational headlines, verifying information through multiple sources, and seeking out first-person accounts from autistic individuals. Moreover, readers can influence future reporting by providing feedback—such as highlighting biased language or praising balanced coverage—to encourage editors and journalists to refine their practices. Over time, consistent engagement may help foster more informed, respectful discussions of autism.

Strengths, Limitations, and Future Work

To our knowledge, this study is the first to examine how newspaper reading behaviour relates to attitudes toward autism, while simultaneously considering various other factors that influence both attitudes and reading preferences. Our findings build on prior research into press representations of autism—and media portrayals more broadly—by providing empirical evidence that also links this area of inquiry to research on implicit and explicit attitudes.

Despite these contributions, several limitations should be acknowledged. First, this study did not account for several intrinsic and environmental factors that may shape attitudes or reading preferences, leaving ample scope for future research. For instance, socioeconomic status could influence attitudes and might be associated with higher engagement with certain newspapers. Personality traits could also uncover new dimensions of how attitudes toward autism develop and respond to environmental influences, such as media exposure. For example, Cheng et al.²⁷ showed that traits like “vertical individualism” (orientation toward competition and hierarchy) and “horizontal collectivism” (orientation toward equality and group cohesion) may influence implicit and explicit attitudes in cross-cultural samples.

Regarding environmental factors, it is crucial to consider diverse media formats and ecosystems, including social media, which may affect attitudes in unique ways. The rise of echo chambers—where algorithms tailor content to users’ existing views—could further reinforce biases and reduce opportunities for attitudinal change.⁸⁰

Crucially, although our survey-based analysis quantified the contributions of various factors, much remains to be learned about the causal mechanisms. Because this was a cross-sectional

study, data were collected at a single time point, limiting robust conclusions about causality. Future work could adopt longitudinal designs or manipulate exposure to specific media content to examine how attitudes shift over time.

Our sampling approach also poses certain limitations. We recruited participants through an online platform, whose users may exhibit unique characteristics.⁹⁵ Our sample included a higher proportion of women, younger adults, and individuals with higher educational attainment than would be expected in the general population, potentially introducing confounds. For example, men in this sample held more positive explicit attitudes than women, and participants with higher educational attainment or contact experience exhibited less favourable explicit attitudes. These patterns may reflect idiosyncrasies of the sample or underlying factors, such as the quality of autism-related education or contact, which were not assessed in this study.^{61, 63, 96} Future research should employ more diverse sampling methods to better capture the complexities of real-world reading behaviours and attitudes toward autism.

Finally, more nuanced approaches are needed to measure attitudes toward autism in real-life settings or consider how attitudes differ across subgroups of autistic people—particularly those less frequently or more negatively portrayed in the press, such as autistic adults,⁹⁴ autistic women, and LGBTQIA+ autistic people.³² Acceptance and attitudinal change for these intersectional groups may be especially urgent.^{21, 32}

CRedit author statement

Themis Karaminis: Conceptualisation (lead), Methodology (equal), Formal analysis (lead), Visualisation (lead), Writing - Original Draft (equal); Writing - Review & Editing (lead); **Marta Dickinson:** Conceptualisation (supporting), Methodology (equal), Data Curation, Formal analysis (supporting), Visualisation (supporting), Writing - Original Draft (equal); Writing - Review & Editing (supporting).

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Figure legends

Figure 1. Factors Influencing Explicit Attitudes and the Role of Newspaper Reading Behaviour.

A. The pie chart illustrates the contribution of various predictors to the explained variance in explicit attitudes toward autism, as measured by the Societal Attitudes Towards Autism Scale (SATA). Contributions were determined using hierarchical partitioning analysis for the GAM model weighted by overall newspaper exposure. This procedure calculated the proportion of adjusted R^2 attributed to individual predictors. Segments are arranged clockwise from the top, with their distance from the centre indicating the significance of the corresponding factor (greater distance signifies lower p-values). The light grey segment represents variance unexplained by the model.

B, C, and D. These panels depict the partial effects of three predictors related to newspaper reading preferences on attitudes toward autism, based on estimates from the GAM model. **Panel B** shows the effect of preferences for right-leaning tabloids over left-leaning broadsheets, **Panel C** illustrates the effect of trust preferences for right-leaning tabloids, and **Panel D** presents the effect of overall trust in newspapers. The framing of each panel denotes the significance of the partial effects: a dotted line indicates a non-significant effect, a solid line signifies a significant effect, and a bold solid-line frame highlights a highly significant effect. The individual contribution in adjusted R^2 and the corresponding p-values (*: $p < .05$, **: $p < .01$, ***: $p < .001$) are shown at the top of each plot.

As an example, **Panel B** demonstrates a linear decrease in D-scores as preferences for reading right-leaning tabloids increase, indicating that stronger preferences for right-leaning tabloids are associated with less favourable explicit attitudes toward autism. This effect, which contributes 4.3% of the explained variance, is highly significant.

Figure 2. Factors Influencing Implicit Attitudes and the Role of Newspaper Reading Behaviour.

A. The pie chart illustrates the contribution of various predictors to the explained variance in implicit attitudes toward autism, measured using the AAS.

B, C, and D. Panels depict the partial effects of three predictors related to newspaper reading preferences on implicit attitudes.

The configuration of this figure is identical to Figure 1; the reader may refer to its caption for further details.

Figure 3. Factors Influencing Knowledge About Autism and the Role of Newspaper Reading Behaviour.

A. The pie chart shows the contribution of various predictors to the explained variance in knowledge about autism.

B, C, and D. Panels illustrate the partial effects of three predictors related to newspaper reading preferences on knowledge about autism.

The configuration of this figure is identical to Figure 1; the reader may refer to its caption for further details.

Figures

Figure 1

Explicit Attitudes

A. Contributions to explained variance

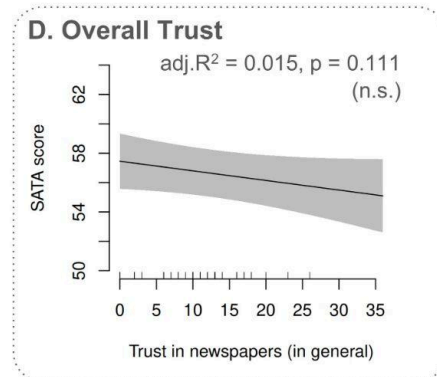
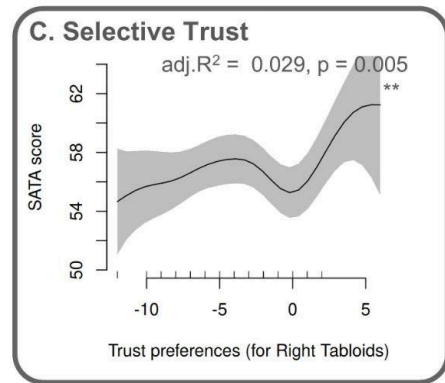
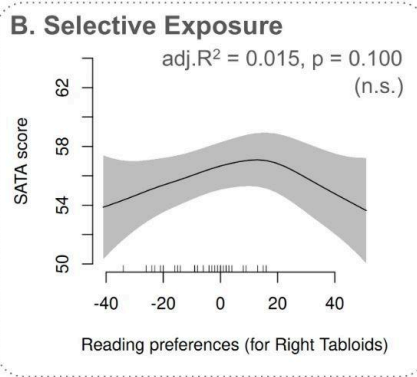
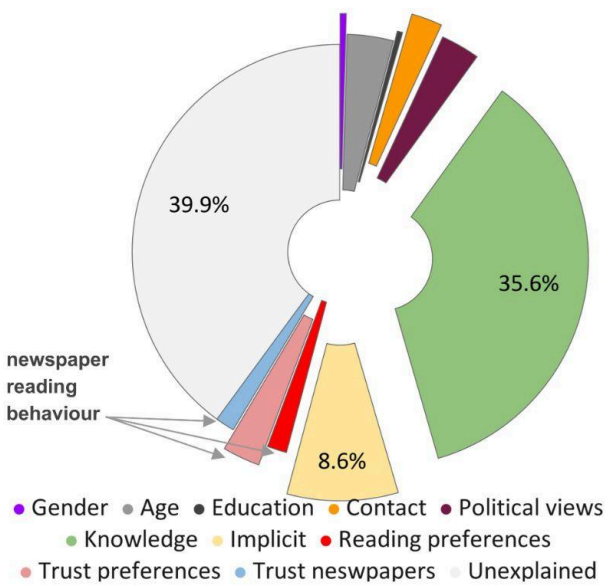


Figure 2

Implicit Attitudes

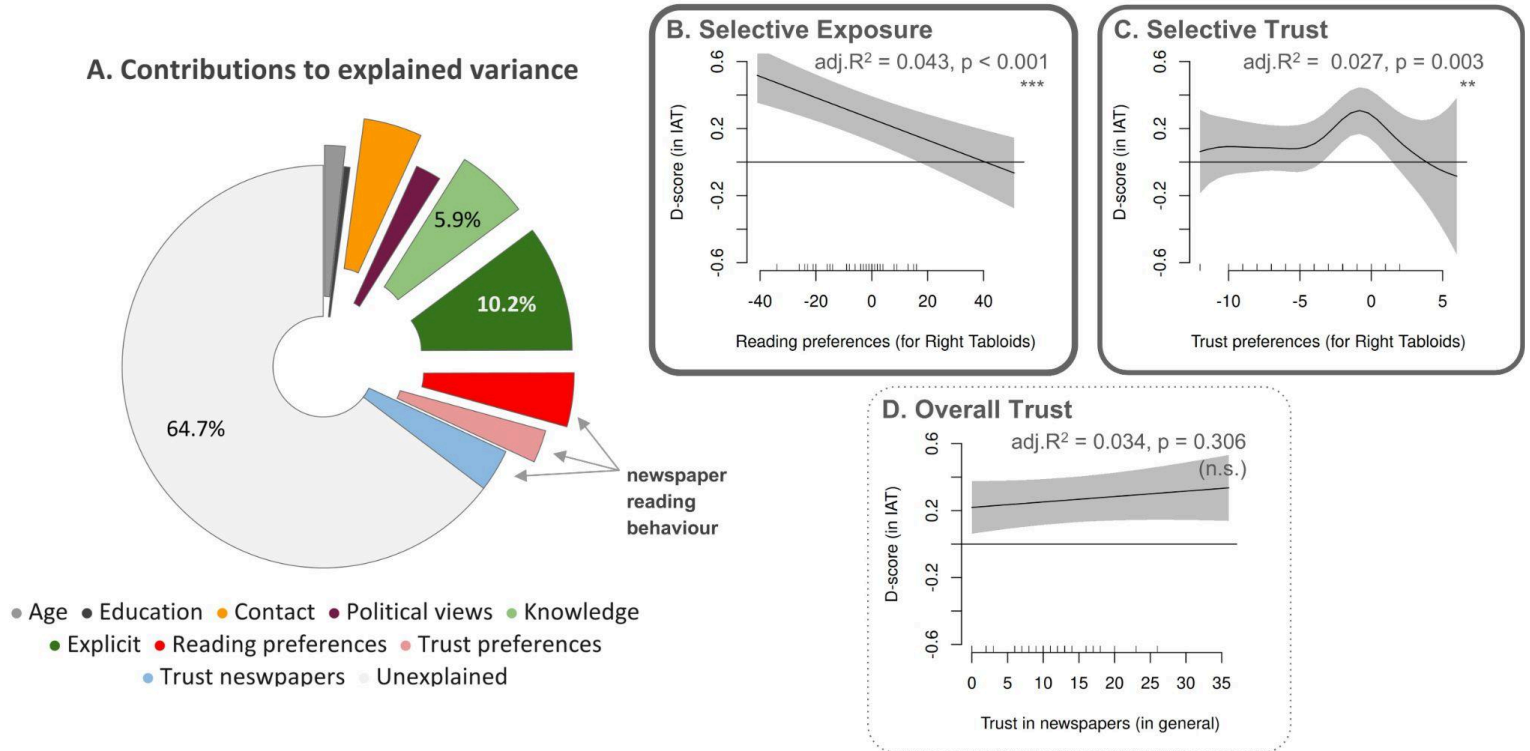
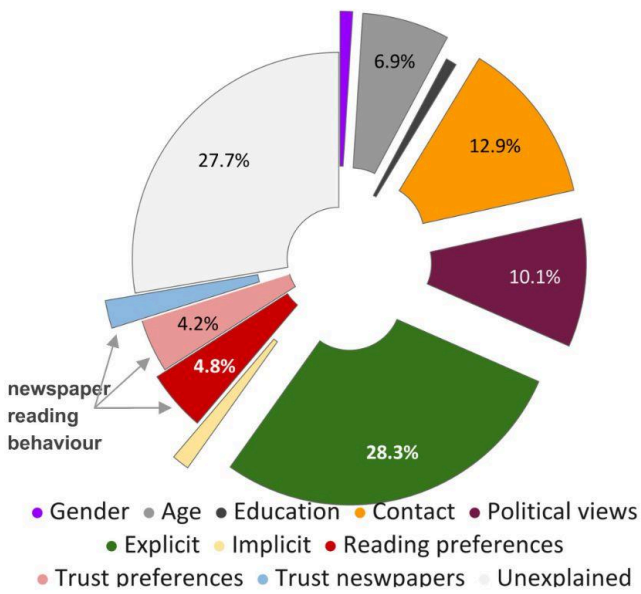


Figure 3

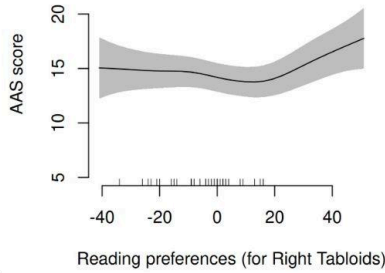
Knowledge about Autism

A. Contributions to explained variance



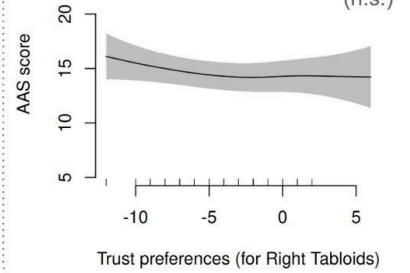
B. Selective Exposure

adj.R² = 0.048, p = 0.0313 *



C. Selective Trust

adj.R² = 0.042, p = 0.285 (n.s.)



D. Overall Trust

adj.R² = 0.022, p = 0.005 **

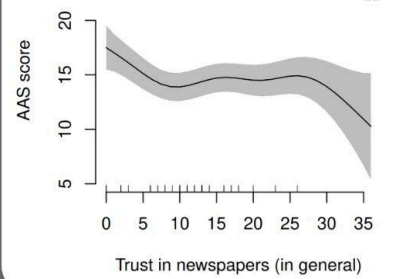


Table 1. Participants' Demographics and Characteristics

Demographic or characteristic	Category	Counts	Percentage
Gender	Female	180	65.0%
	Male	96	34.7%
	Other	1	0.4%
Age	18-24	24	8.7%
	25-34	77	27.8%
	35-44	71	25.6%
	45-54	44	15.9%
	55-64	14	5.1%
	65+	3	1.1%
Education	GCSE or lower	38	13.7%
	A-Levels or equivalent	51	18.4%
	Certificate, Diploma or Foundation	31	11.2%
	Degree	122	44.0%
	Bachelors Degree	29	10.5%
	Masters Degree	6	2.2%
	PhD or Professional Doctorate	0	0
Political Leaning	Left	54	19.5%
	Left-Leaning	97	35.0%
	Centre	83	30.0%
	Right-leaning	25	9.0%

Demographic or characteristic	Category	Counts	Percentage
	Right	3	1.1%
	Other	3	1.1%
	Prefer not to say	12	4.3%
Contact with autistic people	"No, I don't know anyone who is autistic."	67	24.2%
	"Yes, I know someone who is autistic, but I don't spend time with them."	65	23.5%
	"Yes, I know someone who is autistic, but I only spend time with them infrequently."	67	24.2%
	"Yes, I know someone who is autistic and spend time with them often or regularly."	78	28.2%