

The Impact of Algorithmic Recommendation on Youth's News Exposure Behavior: The Moderating Role of Media Literacy

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ABSTRACT

Nowadays, young people consume news very differently from the past. Instead of reading newspapers or watching TV news, many of them rely on mobile apps that use algorithms to recommend content. These algorithms track what users click on, how long they stay, and what they like, then push similar content to them. This makes information access convenient, but over time, users may end up seeing only a narrow range of topics^{[1][2]}. This study focuses on whether heavy use of algorithmic recommendation is associated with the breadth, depth, and homogeneity of news that young people are exposed to, and whether media literacy can buffer these associations. A questionnaire survey was conducted online with 312 valid responses from people aged 18–35. Results show that higher use of algorithmic recommendation is associated with narrower news breadth and higher content homogeneity, but it is not significantly associated with news depth. Media literacy plays a significant moderating role: for those with higher media literacy, the negative associations of algorithmic recommendation are weaker^{[3][4]}. These findings suggest that improving young people's media literacy is a practical way to reduce the downsides of algorithmic news distribution.

Keywords: Algorithmic Recommendation; Youth; News Exposure; Information Cocoon; Media Literacy

1. INTRODUCTION

In recent years, algorithmic recommendation technology has become widely used in major news platforms. Apps like Douyin (TikTok in China), Toutiao, and Weibo all use algorithms to analyze users' behavior—clicks, dwell time, and interactions—to predict what they might like and push that content to them^{[5][6]}. From the user's point of view, this is useful: you don't have to search hard; interesting content comes to you automatically. But there is a downside. Many scholars worry that long-term exposure to algorithmically selected content may trap users in a "cocoon" of similar information, limiting their exposure to different perspectives^{[7][8]}.

This issue is especially important for young people. People in their late teens to early thirties are in a critical stage of building knowledge and forming worldviews. The news they see every day shapes how they understand society^[9]. Young people are also heavy internet users, and many of them get almost all their news from algorithmic platforms. A survey found that nearly 80% of college students think they should reduce their reliance on algorithmic recommendations^[10], which shows that many are already aware of the problem.

Several theories can help explain this. Uses and gratifications theory says that people actively choose media to satisfy their needs^[11]. But with algorithmic recommendation, users' initiative is partly replaced—they are led by the algorithm rather than leading themselves. Information cocoon theory suggests that people tend to consume content that matches their existing preferences, and algorithms reinforce this tendency^{[7][8]}. Media literacy theory offers a possible solution: if people have the skills to judge and select information critically, they may be less affected by algorithms^{[3][12]}.

Although many studies have looked at algorithmic recommendation and information cocoons, few have focused specifically on young people and their news exposure behavior^{[9][13]}. Even fewer have treated media literacy as a moderating variable. This study tries to fill that gap by asking two questions: Is algorithmic recommendation significantly associated with the breadth and depth of young people's news exposure and the homogeneity of content they see? And does media literacy moderate these associations?

2. THEORETICAL BACKGROUND AND RESEARCH HYPOTHESES

2.1 Main Theories

Uses and gratifications theory, proposed in the mid-20th century, argues that audiences are not passive receivers but active choosers of media to meet their needs^[11]. For example, someone may read news to stay informed, or watch short videos to kill time. However, in an algorithmic environment, the algorithm detects user preferences and keeps feeding similar content, reducing the user's motivation to search and explore on their own^{[5] [14]}.

Information cocoon theory, introduced by Sunstein, describes how individuals, due to cognitive limits or personal preference, tend to select information that they already like or agree with, thus enclosing themselves in a homogeneous information space^{[7] [8]}. Algorithmic recommendation is believed to intensify this, because it predicts preferences from past behavior and delivers only preference-consistent content^{[6] [15]}.

Media literacy theory deals with people's ability to access, analyze, evaluate, and create media messages^{[3] [12]}. Traditionally, media literacy meant distinguishing true from false news and detecting bias. In the age of algorithms, the concept needs to expand: it should also include understanding how algorithms work, knowing how one is being profiled, and having the awareness to break out of algorithmic filters^{[4] [13]}.

2.2 Research Hypotheses

Based on these theories and previous studies, we propose the following hypotheses:

H1: Higher use of algorithmic recommendation is associated with narrower news exposure breadth.

H2: Higher use of algorithmic recommendation is associated with shallower news exposure depth.

H3: Higher use of algorithmic recommendation is associated with higher content homogeneity.

H4: Media literacy moderates these relationships—higher media literacy weakens the negative associations of algorithmic recommendation^{[3] [12]}.

3. RESEARCH DESIGN AND METHODS

3.1 Participants

The target population was young people aged 18–35. This age group is the main user base of algorithmic platforms, frequently consumes news, and is at a critical stage of cognitive and value development^{[9] [13]}.

3.2 Survey Procedure

We used an online questionnaire created on Wenjuanxing (a Chinese survey platform) and distributed it via WeChat and QQ. Data collection took place from November to December 2025. We received 380 responses, of which 312 were valid (82.1% response rate).

3.3 Sample Characteristics

Among the 312 valid respondents, 148 were male (47.4%) and 164 female (52.6%). Age distribution: 18–22 years old (42.3%), 23–28 (35.6%), 29–35 (22.1%). Education: bachelor's degree or below (51.6%), master's (38.1%), doctoral (10.3%). Occupations: students (45.5%), employees in enterprises or public institutions (32.4%), freelancers (12.2%), others (9.9%).

3.4 Measures

All items were rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Scales were adapted from previous research^{[11] [14]} and modified for our context.

Algorithmic recommendation usage scale: 3 items, e.g., "I mainly get news from algorithmic platforms like Douyin and Toutiao," "I rely more on algorithmic recommendations than on active search," "I open algorithmic news apps multiple times a day." Cronbach's $\alpha = 0.82$.

News exposure behavior scale: three dimensions with 6 items total. Breadth (2 items, e.g., "I actively follow news from different fields"), depth (2 items, e.g., "I read in-depth and seek background information on interesting news"), and

homogeneity (2 items, e.g., “Most news I browse daily is of the same type”). α values were 0.79, 0.76, and 0.81, respectively.

Media literacy scale: three dimensions with 6 items total. Information verification (2 items, e.g., “I check whether news sources are authoritative”), algorithm awareness (2 items, e.g., “I know that algorithms recommend content based on my behavior”), and critical thinking (2 items, e.g., “I question the objectivity of algorithm-recommended news”). The dimensional α values were 0.81, 0.79, and 0.83, respectively; the overall α was 0.85^{[3][12]}. To justify treating media literacy as a single moderator, we conducted a confirmatory factor analysis (CFA) on the 6 items. The one-factor model showed acceptable fit: $\chi^2/df = 2.31$, CFI = 0.96, TLI = 0.94, RMSEA = 0.067, SRMR = 0.051, supporting the use of a composite score. (As a robustness check, we also tested each dimension separately; the pattern of moderation was consistent, though slightly weaker for algorithm awareness.)

3.5 Data Analysis

We used SPSS 26.0 for descriptive statistics, correlation, and regression analyses. The PROCESS macro (version 4.0, Hayes, 2018)^[4] was used to test moderation effects.

4. RESULTS

4.1 Descriptive Statistics and Correlations

Table 1 presents means, standard deviations, and correlations.

Table 1. Means, standard deviations, and correlations among variables.

Variable	Mean	SD	1	2	3	4
1. Algorithm use extent	3.42	0.89	1			
2. News exposure breadth	3.15	0.78	-0.31**	1		
3. News exposure depth	3.28	0.82	-0.12	0.29**	1	
4. Content homogeneity	3.56	0.91	0.38**	-0.35**	-0.18*	1
5. Media literacy	3.51	0.76	-0.14*	0.29**	0.33**	-0.22**

Note: * $p < 0.05$, ** $p < 0.01$

As seen in Table 1, algorithm use extent is negatively correlated with news exposure breadth ($r = -0.31$, $p < 0.01$) and positively correlated with content homogeneity ($r = 0.38$, $p < 0.01$)—both relationships are significant. However, the correlation between algorithm use extent and news exposure depth is not significant ($r = -0.12$, $p > 0.05$). In addition, media literacy is positively correlated with news exposure breadth ($r = 0.29$) and depth ($r = 0.33$), and negatively correlated with content homogeneity ($r = -0.22$), suggesting that people with higher media literacy do indeed consume more broadly and deeply and experience less homogeneity.

4.2 Main Effects Test

Next, hierarchical regression was used to examine whether algorithm use extent statistically predicts news exposure behavior. Results are shown in Table 2.

Table 2. Main Effects Regression Results.

Predictor	News exposure breadth (β)	News exposure depth (β)	Content homogeneity (β)
Gender (control)	0.04	0.06	-0.03
Age (control)	0.07	0.09	-0.05
Education (control)	0.10	0.12*	-0.07
Algorithm use extent	-0.29**	-0.09	0.36**
R ²	0.12	0.05	0.16
F	10.35**	3.12*	14.78**

Note: * $p < 0.05$, ** $p < 0.01$

After controlling for gender, age, and education, algorithm use extent significantly and negatively predicted news exposure breadth ($\beta = -0.29$, $p < 0.01$)—meaning the more it is used, the narrower the exposure, so H1 is supported. The positive prediction for content homogeneity was also significant ($\beta = 0.36$, $p < 0.01$)—more use is associated with more homogeneous content, so H3 is supported. However, the prediction for news exposure depth was not significant ($\beta = -0.09$, $p > 0.05$), so H2 was not supported.

4.3 Moderating Effect of Media Literacy

Next, PROCESS was used to test whether media literacy moderates the relationship between algorithm use and news exposure behavior. Results are shown in Table 3.

Table 3. Moderation Effect Results (using PROCESS Model 1).

Outcome variable	Predictor	β	SE	t	p	95% CI
News breadth	Algorithm use (A)	-0.38	0.07	-5.43	<0.01	[-0.52, -0.24]
	Media literacy (M)	0.25	0.06	4.17	<0.01	[0.13, 0.37]
	A $\times$ M	0.18	0.05	3.60	<0.01	[0.08, 0.28]
News depth	Algorithm use (A)	-0.11	0.08	-1.38	>0.05	[-0.27, 0.05]
	Media literacy (M)	0.31	0.07	4.43	<0.01	[0.17, 0.45]
	A $\times$ M	0.09	0.06	1.50	>0.05	[-0.03, 0.21]
Homogeneity	Algorithm use (A)	0.44	0.07	6.29	<0.01	[0.30, 0.58]
	Media literacy (M)	-0.19	0.06	-3.17	<0.01	[-0.31, -0.07]
	A $\times$ M	-0.21	0.05	-4.20	<0.01	[-0.31, -0.11]

Note: All models controlled for gender, age, and education. CI = confidence interval.

The results show that media literacy indeed plays a moderating role. In the relationship between algorithm use and news exposure breadth, the interaction term is significant ($\beta = 0.18$, $p < 0.01$), meaning that for people with higher media literacy, the negative association of algorithm use with breadth is weaker. In the relationship between algorithm use and content homogeneity, the interaction term is also significant ($\beta = -0.21$, $p < 0.01$), meaning that for people with higher media literacy, the homogeneity effect is weaker. H4 is largely supported.

Further simple slope analysis was conducted. The sample was split into high and low media literacy groups (one standard deviation above and below the mean). In the low media literacy group, the negative association of algorithm use with news exposure breadth was stronger ($\beta=-0.41$, $p<0.01$). In the high media literacy group, this association became weak and non-significant ($\beta=-0.12$, $p>0.05$). Similarly, for content homogeneity, the positive association of algorithm use was strong in the low media literacy group ($\beta=0.49$, $p<0.01$), but much weaker in the high media literacy group ($\beta=0.18$, $p<0.05$), though still significant.

5. DISCUSSION

5.1 Associations of Algorithmic Recommendation with News Exposure

Our results show that heavier use of algorithmic recommendation is linked to narrower news breadth and higher content homogeneity. This aligns with information cocoon theory^{[7][8]}. Algorithms track user preferences and keep feeding similar content, and over time users become enclosed in a relatively closed information environment^{[5][15]}. Young people, who are at a stage where they need broad exposure to various topics, may suffer cognitive limitations if they constantly see similar news^{[9][13]}.

Interestingly, algorithm usage was not significantly associated with news depth. This suggests that whether a person reads news in depth depends more on their personal reading habits and thinking style than on the channel they use^[11]. Even with algorithmic platforms, some users still go deeper into topics they find interesting.

Some scholars have argued that algorithms do not necessarily lead to information cocoons^{[6][8]}. Our findings suggest that the effect may depend on individual factors, which is consistent with the moderation role we tested.

5.2 Why Media Literacy Matters

Our moderation findings are valuable. Media literacy significantly buffers the negative associations of algorithmic recommendation^{[3][4][12]}. People with higher media literacy actively verify information, understand how algorithms work, and consciously adjust their browsing behavior to influence recommendations^{[13][14]}. Therefore, they are less likely to be led by algorithms and can maintain a more diverse news diet even when using algorithmic platforms^{[10][15]}.

This has practical implications. Instead of relying solely on technological fixes or platform self-regulation, we should focus on enhancing users' own capabilities^{[2][10]}. If young people generally have high media literacy, the problems caused by algorithmic recommendations may be less severe.

5.3 Limitations and Future Directions

This study has some limitations. First, our sample was collected online via social networks, which may not represent all young people—those who use the internet less or do not use social media are underrepresented. Second, the cross-sectional design means we can only talk about associations, not causality^[5]. Third, self-reported questionnaires may be affected by social desirability bias. Future research could use longitudinal or experimental designs to establish causality, and qualitative interviews could provide richer insights into young people's actual experiences with algorithmic news^{[1][9]}.

6. CONCLUSION

This study surveyed 312 young people aged 18–35 to examine how algorithmic recommendation usage is associated with their news exposure behavior and whether media literacy moderates these associations. We found that higher algorithm usage is associated with narrower news breadth and higher content homogeneity, but not with shallower depth. Media literacy significantly moderates the relationships between algorithm usage and both breadth and homogeneity—those with higher literacy suffer less from the negative associations^{[3][4][12]}. This shows that the problems related to algorithmic recommendation are not unsolvable; improving media literacy is a viable direction^{[2][10]}. Families, schools, and society should pay more attention to media literacy education to help young people maintain a clear mind and broad vision in the age of algorithms^{[1][9][13]}.

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