

ALGORITHMIC MISINFORMATION AND ITS ROLE IN SHAPING SECTARIAN ATTITUDES AND SOCIAL IDENTITY AMONG UNIVERSITY YOUTH IN PUNJAB, PAKISTAN

Mehar Sohail¹, Aqsa Riaz²

¹ MPhil Scholar, Lecturer Department of Psychology, University of Okara, Pakistan, Email: meharsohail1.pk@gmail.com

² MPhil Scholar, Department of Sociology, University of Okara, Pakistan, Email: aqsa.riaz162@gmail.com

Corresponding Author:

Mehar Sohail

Email: meharsohail1.pk@gmail.com

Abstract

The blistering development of digital spaces that are supported with the help of artificial intelligence (AI) has dramatically changed how people receive information, and it is estimated that misinformation that is propagated by algorithms and can alter social attitudes spread. The current research paper has studied how the exposure to algorithmic misinformation can influence sectarian attitudes among Pakistani youth in university in Punjab. The research also examined the mediating and moderating effect of critical thinking and strength of social identity respectively in the relationship. Cross-sectional survey was used, and the researcher gathered data on 300 students of different universities in Punjab aged between 18 and 30 years old. Exposure to algorithmic misinformation, sectarian attitudes, critical thinking and strength of social identity were measured using standardized self-report measures. The reliability analysis, correlation analysis, multiple regression, and mediation and moderation analyses were used to analyze data. The results indicated that exposure to algorithmic misinformation had a good relationship with sectarian attitudes in university students. Critical thinking showed a negative correlation with sectarian attitudes and partly mediated the association between misinformation exposure and sectarian attitudes, which indicated that people with greater analytical skills were less vulnerable to the misinformation. Moreover, the strength of social identity played a significant modulating role on the relationship between exposure to misinformation and sectarian attitudes meaning that individuals who had stronger religious group identification were more prone to develop sectarian bias when they were exposed to misinformation. These results underscore the complicated interplay of digital information space, cognitions, and intergroup identity to influence intergroup attitudes. The research will be added to the expanding body of knowledge regarding misinformation and social identity by offering empirical data on the situation in a developing nation. Digital literacy education, media regulation and social harmony initiatives have practical implications that are addressed.

Keywords: algorithmic misinformation, sectarian attitudes, critical thinking, social identity, social media, Pakistan.

1. Introduction

Artificial intelligence (AI) has emerged as the focal point in the spread of information throughout the social media in the modern era of digitalization. AI-driven algorithms recommend content depending on their usage, interests, and previous interactions, which tends to form filter bubbles and echo chambers with users being shown content that confirms their existing opinions, and tends to shape their thoughts and attitudes (Pariser, 2011). Although this customization has the potential of improving user experience, it is associated with the possibility of increasing misinformation, especially emotionally charged or biased content. Within the framework of Pakistan and more so Punjab, youth aged 18-30 is a major source of information through social media. Such young adults are exposed to religious and sectarian stories on the Internet on a regular basis. Although the existence of sectarian

tensions dates back, nowadays, they are more influenced and fueled by the use of misinformation, driven by algorithms, which may shape attitudes, cement in-group loyalty, and bias against out-groups (Khan et al., 2022; Hassan and Iqbal, 2021).

The problem of algorithmic misinformation does not just influence the process of knowledge acquisition; it also constructs the social perception and intergroup relationships. The young people are especially prone to taking on the biased or polarized opinions, as they interact with digital platforms and social media extensively. This paper explores the role of misinformation through AI and its role in sectarian attitudes and how critical thinking can mediate such relationship. The paper also examines whether or not the strength of social identity mediates the effect and the interaction between the cognitive processing, on the one hand, and the identification with the social group in the digital age, on the other hand.

1.2 Problem Statement

Although the misinformation generated by algorithms through social media is widespread in Pakistan, and especially among university students, there are limited studies examining the psychological effects of the issue. Sectarian attitude still affects social relations, education, and even political activism, but there is still no substantial empirical evidence to show how online misinformation contributes to such attitudes. In particular, one cannot understand how the social media-intensive young adults in Punjab develop and sustain sectarian biases through the impact of AI-selected content. Also, critical thinking has been cited as a safeguarding intelligence against misinformation (Facione, 2011; Pennycook and Rand, 2019), but the mediating role of critical thinking on the Pakistani socio-cultural setting has not been studied exhaustively. In addition, the social identity strength, depicting the level of attachment of an individual to the in-group, can either enhance or reduce the impact of algorithmic misinformation, but the moderating role has never been prospectively investigated in Punjab. The study will fill these gaps by investigating the association between AI-centered misinformation, sectarian, critical-thinking, and social-identity-strength among youth in the university.

1.3 Rationale of the Study

It is important to know the connection between AI-driven fake news and sectarianism due to several reasons. To start with, it is practically important, as determining the cognitive and social processes that will increase or decrease bias would inform the interventions that could be used to teach youth to think critically and be tolerant. Second, it is theoretically important, because it applies Social Identity Theory (Tajfel and Turner, 1979) to the online context and proves the mediating value of mental processes in influencing social attitudes. Third, the research holds importance in the society, considering that it throws light on how social media has contributed to sectarian divisions or alleviating them, and provides the policymakers, educators, and civil society organizations with numerous insights on enhancing intergroup harmony. As the social media continues to gain prominence in perception and behavior making in Pakistan, it is timely and relevant to analyze the dynamics. The results can be used to develop measures to decrease the vulnerability to misinformation, strengthen social identity, and increase the quality of the online discussion among young people at the university.

1.4 Objectives of the Study

1. Test how exposure to AI-based misinformation has a direct effect on sectarian attitudes.
2. Explore the mediating effect of critical thinking between exposure to misinformation and sectarian attitudes on misinformation.
3. Find out whether social identity strength mediates the impact of AI-based misinformation on sectarian attitudes.

1.5 Research Questions

1. How are exposure to AI-generated misinformation and sectarian attitudes related in university youth in Punjab?
2. Is there a critical thinking mediator between AI-induced misinformation and sectarian attitudes?
3. Does the strength of social identity mediate the association between the exposure to AI-driven misinformation and sectarian attitudes?

1.6 Hypotheses

1. H1: Sectarian attitudes in university students are positively linked to exposure to AI-based misinformation.
2. H2: Exposure to AI-driven misinformation has a mediated relationship with the attitudes of sectarianism.
3. H3: There is a moderating effect of the relationship between exposure to AI-driven misinformation and sectarian attitudes, where stronger social identity intensifies the effect.

1.7 Significance of the Study

The significance of this research can be summarized across three domains:

Practical Significance: The study provides empirical evidence to inform educational interventions and digital literacy programs that can reduce susceptibility to misinformation among youth.

Theoretical Significance: The study extends Social Identity Theory and integrates cognitive mediation into the context of digital misinformation, offering new insights into the psychological processes driving intergroup biases.

Societal Significance: By identifying mechanisms that exacerbate sectarian attitudes, the research can guide policy and advocacy efforts to enhance social cohesion and promote tolerance in multi-sectarian communities.

2. Literature Review

The blistering development of social media and artificial intelligence-based content proposal systems has altered the situation in the consumption of information worldwide. The emergence of social media allows connectivity and access to a variety of opinions but at the same time allows the distribution of misinformation which can also influence the individual attitudes and the relations between the groups significantly (Cinelli et al., 2021). Sectarianism has been a source of social and political dynamics affecting Pakistan and the social media has increased these tensions in modern days (Hassan and Iqbal, 2021). The purpose of the literature review is to investigate the primary variables of the study exposure to AI-based misinformation, sectarian attitudes, critical thinking, and strength of social identity and their interconnection with each other with regard to research gaps in terms of university youth in Punjab.

2.1 AI-Driven Misinformation

The constant work of AI algorithms on Facebook, Tik Tok, and Instagram is aimed at ensuring that the user is offered as much engagement as possible by showing them the content that is related to their past preferences. This form of algorithmic curation tends to produce echo chambers or filter bubbles where the user repeatedly consumes similar content, which could then potentially perpetuate a biased or false belief (Pariser, 2011; Allcott and Gentzkow, 2017). As Pennycook and Rand (2019) showed, repeated exposure to misinformation makes it a perceived fact especially when it comes to lower ability users. Cinelli et al. (2021) emphasized the fact that the algorithmic recommendation systems advance polarization through the propagation of the content that provokes the strongest emotional reactions. Khan et al. (2022) have mentioned that in Pakistan, in-group favoritism

and out-group prejudice among younger people are facilitated by the algorithmic amplification of religious posts on social media. These articles suggest that AI-driven misinformation is not simply a technological issue, but a phenomenon of psychosocial nature that affects attitudes and intergroup relations.

2.2 Sectarian Attitudes

Sectarian attitudes are the prejudices or liking of a religious or sect group toward others with sometimes negative opinions of the out-groups (Hassan and Iqbal, 2021). These attitudes are influenced by socio-cultural accounting, historical, and the media exposure at the time. In Pakistan, the studies show that young people who have been exposed to the biased religious information tend to have more negative out-group stereotypes (Hassan and Iqbal, 2021). Research on South Asia focuses on the fact that online spaces enhance the effect of in group identification and out group derogation, particularly when the content is emotionally provoking or sensationalized (Khan et al., 2022). Misinformation has been found to cause polarization, empathy, and encouragement of discriminatory behavior between groups (Allcott and Gentzkow, 2017). In such a way, the impact of offline socio-cultural determinants and online exposure to algorithms are also likely to have an influence on sectarian attitudes among university students in Punjab.

2.3 Critical Thinking as an Intermediary

Critical thinking refers to the capacity to review, evaluate and integrate information impartially and then make an objective judgment (Facione, 2011). It is a mental protection against the impact of misinformation. Pennycook and Rand (2019) discovered that people who had a higher level of analytical thinking were less prone to believing and spreading fake news. According to Facione (2011), biased reasoning can be minimized by promoting critical thinking which improves evidence-based decision-making. Research has shown that in Pakistan, students who have higher levels of critical thinking will be better positioned to challenge sectarian discourses over the Internet and hold non-partisan views (Khan et al., 2022). Considering these results, it is postulated that critical thinking helps moderate the effect of exposure to AI-induced misinformation and sectarian attitudes. The more critical thinking an individual has the better they will be resistant to misinformation, thus limiting the development or by the negative opinions.

2.4 Social Identity Strength as a Moderator

The Social Identity Theory (Tajfel and Turner, 1979) hypothesizes that people draw certain aspects of their self-concept about belonging to social groups which results in the in-group favoritism and out-group prejudice. Social identity strength is the extent to which a person identifies strongly with a group e.g. a religious sect and high social identity can strengthen the effect of biased contents since individuals tend to believe information that concurs with their in-group (Tajfel and Turner, 1979). Studies conducted in Pakistan show that young people who have a strong sectarian affiliation are more susceptible to algorithmically edited religious information, resulting in more sectarian inclinations (Hassan and Iqbal, 2021). On the other hand, the moderating effect entails the less prone of individuals with weak social identity to biased information (Khan et al., 2022). Thus, the effect of AI-based misinformation on sectarian attitudes is anticipated to be mediated by social identity strength, which increases the effects of AI-related misinformation in people with strong in-group attachment.

2.5 Integration of Variables

The literature proposes a conceptual avenue according to which AI-based misinformation affects sectarian sentiments. This effect can be minimized with the help of critical thinking, which allows evaluating the material analytically, and strengthening or weakening the relationship with social identity, depending on the individual adherence to the group. Figure

2.1 is the suggested conceptual framework, which is constructed on the basis of the literature review. The focus of this integration is on the cognitive and social pathway (critical thinking and social identity) in terms of the development of sectarian attitudes in a digital setting.

2.6 Research Gap

Although the impacts of social media misinformation and critical thinking have been studied internationally, there are very limited studies on the same in the context of Pakistan, especially, on university youth in Punjab. No empirical studies have been conducted to investigate the mediating effect of critical thinking and the moderating effect of the strength of social identity regarding the algorithmically curated sectarian content. This paper fills this gap by presenting context based evidence on both the cognitive and social processes at play on sectarian attitudes.

3. Methodology

The current research used the quantitative correlational cross-sectional researches. This design was chosen due to the possibility of researchers to analyze the relationship among variables and to test hypothesized models in the form of mediating and moderating processes (Creswell and Creswell, 2018). Within the framework of the current study, the design could have allowed the study of the effect of exposure to AI-mediated misinformation (independent variable) on sectarian attitudes (dependent variable), and also to evaluate the mediating effect of critical thinking and the moderating effect of the strength of social identity. A cross-sectional design was the best choice, as it will enable gathering data about a vast amount of participants at one time, which will give an idea of the existing social and psychological processes between university students in Punjab.

3.1 Research Setting and Environment

The research was carried out in the universities of the Pakistani province of Punjab that is the most densely populated and has a significant number of institutions of higher learning. Universities offer a perfect background to this study since students in this context are often highly occupied with online platforms and often exposed to different perspectives via social media. The research setting was through the use of both publicly and privately owned universities in the biggest cities of Lahore, Faisalabad, Multan, and Gujranwala. These institutions are a variety of socio-cultural and education backgrounds, which allows a more detailed interpretation of the research variables.

3.2 Population of the Study

The study population comprised of university students undertaking undergraduate and postgraduate courses in Punjab, Pakistan, and frequently use social media. University young people are an especially topical group of the population since they are one of the most active consumers of digital technologies and social networking sites. In accordance with the recent statistics, an important percentage of the Pakistani young population use social media as a major source of information and communication, which makes them more exposed to tailored content produced through algorithms (Khan et al., 2022).

3.3 The sample and Sampling Technique

The study was done on a sample of 300 university students who are between 18 and 30 years of age. The size of the sample was regarded as sufficient to perform the correlational and regression analysis to test the mediating and moderating relationships (Tabachnick and Fidell, 2019). The participants were identified through the convenience sampling method that is normally applied in the study of social sciences when the researcher faces some logistical restrictions in reaching their participants. Convenience sampling is not completely random but it enables the researcher to sample the accessible individuals in institutions of learning in an efficient way. Both males and females were used as a sample to increase diversity in the data sample as well as students of various academic disciplines.

3.4 Measures and Instruments

Standardized self-report questionnaires were employed in order to measure the variables of the study. The presentation of all the instruments was in English as most Pakistani universities are taught in this language. An exposure of AI-generated misinformation was assessed by adapting a scale that was previously developed by Allcott and Gentzkow (2017). The scale comprised of ten questions aimed at gauging the frequency with which the participants are exposed to misleading or biased information on social media sites. The responses of the participants were made on a five-point Likert scale basis between 1 (Strongly Disagree) and 5 (Strongly Agree). The more the scores were high, the more the exposure to AI-driven misinformation. Past research has documented relatively good reliability with such scales with the values of Cronbach alpha being above 0.80. Sectarian attitudes were measured on a twelve-item scale based on a prior study which had been done in the Pakistani setting (Hassan and Iqbal, 2021). The scale gauges attitudes, beliefs and perceptions on various sectarian groups. The members were asked to evaluate the statements concerning group preferences and perceptions on a five-point Likert scale. In past investigations, the instrument proved to have a high degree of internal consistency with a reported Cronbachs alpha of .88, which is highly reliable.

The critical thinking was assessed with the assistance of the items considered within the framework of California Critical Thinking Disposition Inventory created by Facione (2011). The scale had ten items that measured the inclination of the participants to judge information rationally and doubt the validity of sources. The answers were noted on a five point Likert scale. High scores were an indication of better critical thinking skills. Past studies have proved that the scale has reliability coefficients of more than .80, which is in favor of internal consistency of the scale. Social identity strength was evaluated based on the adapted version of a scale created based on the Social Identity Theory (Tajfel and Turner, 1979). The scale had eight questions that assessed the level to which the respondents felt connected to their religious or social grouping. The participants shared their level of agreement with statements that were related to group identification and belongingness. The scale has been found to be suitable in reliability as past research has indicated that the Cronbachs alpha values of the scale are approximately .80.

3.5 Reliability and Validity

The concept of reliability is the uniformity of a measurement instrument and the concept of validity is how accurately the instrument measures what the instrument is supposed to measure (Field, 2018). In order to establish reliability, internal consistency of every scale was tested on the basis of Cronbach alpha coefficient. The above values of more than .70 were deemed as acceptable in psychological research. The validity of content was achieved after examining the measurement instruments by psychologists and social scientists. These specialists checked whether the items were the best fit to the constructs under measurement. Theoretical basis of the scales supported construct validity because they are popular in the prior literature.

3.6 Data Collection Procedure

The survey was structured and administered to students in the universities, through a survey. The participants were contacted in the campuses of the universities and asked to join the study on a voluntary basis. A short elaboration of the purpose of the research was given to the participants before they completed the questionnaire and they were assured that their answers would be kept confidential. They were also made aware of the fact that their participation was purely voluntary and that they could pull out of the study anytime without any form of penalty. The questionnaires took about 15-20 minutes to be filled.

3.7 Inclusion and Exclusion Criteria

The inclusion criteria included the following: the participants should have been enrolled in the universities of Punjab, aged between 18 and 30 years, and were frequent users of the social media platforms. The participants were locked out when they were not enrolled in a university program and their age was less than 18 years or older than 30 years and when they had a low usage of social media platforms.

3.8 Ethical Considerations

The study followed ethical principles of social science studies that involved research on human subjects. Before data collection, the respondents were made aware about the study and their right to withdraw anytime. Confidentiality and anonymity were taken seriously and none of personally identifiable information was gathered. The statistical data were utilized in academia. The study was initiated using the ethical approval of the institutional review committee concerned.

4. Results

Before using the data to conduct inferential statistical procedures, the data collected were filtered to get the accurate and statistical data testing. The dataset was discussed on the absence of values, outliers, and normality assumptions. The level of missing data was quite low (less than 3%), and the missing data were filled in by mean substitution methods. Tabachnick and Fidell (2019) state that it is reasonable to use such treatment when the ratio of missing values is low. Skew and kurtosis were used to test normality. The findings showed that all variables in the study were within a range of acceptable which is below the range of 2 which implies that the assumption of normal distribution was met (Kline, 2016). Thus, parametric statistical tests were considered suitable in testing the study hypotheses.

Table 1

Reliability Analysis of Study Variables

Scale	Number of Items	Cronbach's Alpha
Algorithmic Misinformation Exposure	8	.84
Sectarian Attitudes	10	.88
Critical Thinking	7	.81
Social Identity Strength	6	.86

All the scales had satisfactory internal consistency results. The alpha coefficients were between .81 and .88, (which is more than the required minimum of .70) implying that the measures implemented in the study can be considered to be reliable in the measurement of the respective constructs (Nunnally and Bernstein, 1994).

Table 2

Demographic Characteristics of Participants (N = 300)

Variable	Category	Frequency (n)	Percentage%
Gender	Male	142	47.3%
	Female	158	52.7%
Age	18–21	118	39.3%
	22–25	131	43.7%
	26–30	51	17.0%
Education	Undergraduate	208	69.3%
	Graduate	92	30.7%

Residence	Urban	182	60.7%
	Rural	118	39.3%

The demographic data show that the sample size was slightly higher among the female population than males. The majority of the participants were aged 18-25, which is the main age of students in the university. Most of the respondents were students pursuing an undergraduate degree and lived in city centers of Punjab.

Table 3
Descriptive Statistics of Study Variables

Variable	<i>M</i>	<i>SD</i>
Algorithmic Misinformation Exposure	3.41	0.72
Sectarian Attitudes	3.18	0.69
Critical Thinking	3.63	0.65
Social Identity Strength	3.77	0.71

Note: M=Mean, SD= Standard Deviation

The findings show that the participants have medium levels of exposure to algorithmic misinformation. On the same note, sectarian attitudes were moderate in the sample. The critical thinking scores were moderate with respect to other variables indicating that students in the university have moderate analytical skills in the assessment of information. Mean values of social identity were also found to be rather high in nature, thus indicating a high degree of identification to religious or sectarian associations.

Table 4
Correlation Matrix of Study Variables

Variable	1	2	3	4
1. Algorithmic Misinformation	1	1	1	1
2. Sectarian Attitudes	.46**	1	1	1
3. Critical Thinking	-.29**	-.35**	1	1
4. Social Identity Strength	.32**	.41**	-.22*	1

*Note. *p < .05, **p < .01*

Analysis by correlation showed that algorithmic misinformation exposure had a positive and significant correlation with sectarian attitudes ($r = .46, p < .01$). This implies that the more people are exposed to misinformation, the higher the chances of them displaying a stronger degree of sectarianism. Critical thinking showed negative relationship with the misinformation exposure and sectarian attitudes meaning that people with higher critical thinking skills are unlikely to be moved by misinformation. The strength of social identity was positively correlated with the sectarian attitudes indicating that high social identity with religious groups might lead to intergroup bias.

Table 5
Multiple Regression Analysis Predicting Sectarian Attitudes

Predictor	B	SE	Beta	t	p
Algorithmic Misinformation	.37	.05	.40	7.05	<.001
Critical Thinking	-.25	.06	-.27	-4.45	<.001
Social Identity Strength	.30	.05	.33	5.87	<.001

Note. $R^2 = .43$, $F(3, 296) = 74.12$, $p < .001$

The regression equation was significant and had the ability to explain 43 percent of sectarian attitudes. Exposure to algorithmic misinformation became a good predictor of sectarian attitudes. This observation implies that exposure to algorithmic misinformation is a key factor that leads to the occurrence of sectarian attitudes among the youth in universities. Critical thinking proved to have an inverse relationship with sectarian attitudes meaning that the more one is able to think analytically, the less vulnerable one is to sectarian narratives. Strong social identity was also an important predictor of sectarian attitudes and this may indicate that there is a strengthening of sectarian bias by strong religious group identification.

Table 6
Mediation Analysis

Path	Beta	SE	p
Misinformation → Critical Thinking	-.29	.04	<.001
Critical Thinking → Sectarian Attitudes	-.26	.05	<.001
Misinformation → Sectarian Attitudes (direct)	.31	.05	<.001

Note. Indirect Effect = .075, 95% CI = [.041, .112]

The mediation analysis revealed that critical thinking can mediate the association between the exposure to algorithmic misinformation and sectarian attitudes partly. It implies that misinformation is likely to have an indirect effect on sectarian attitudes, as it undermines critical assessment skills of individuals.

Table 7
Moderation Analysis

Predictor	Beta	SE	p
Algorithmic Misinformation	.34	.05	<.001
Social Identity Strength	.28	.05	<.001
Interaction (IV × Moderator)	.18	.04	.002

The exposure to misinformation in algorithms and social identity strength were found to have a statistically significant interaction. This means that the correlation between the exposure to misinformation and sectarian attitudes is even stronger in case of the individuals who have stronger religious social identities.

In general, the findings indicated the hypothesis descriptions. Learners of algorithmic misinformation showed strong tendencies toward sectarianism in a significant effect on university students. Critical thinking served as a buffer force that lessened the role played by misinformation, and social identity strength compounded the role of misinformation on sectarian attitudes. These results underscore the psychological processes in which digital misinformation can also affect the attitudes of different groups in the Pakistani setting.

5. Discussion

The current paper set out to test the hypothesis that the frontline activity of algorithmic misinformation contributes to sectarian attitudes in university young people in Punjab, Pakistan, as well as investigate the mediating effect of critical thinking and the moderating effect of social identity strength. The results of the research are significant in terms of the mental processes according to which exposure to misinformation that is enhanced by an algorithm can affect the intergroup attitudes in a socio-religious context.

The study findings demonstrated that having been exposed to algorithmic misinformation was positively related to sectarian attitudes among students in universities. This discovery indicates that people who regularly get access to fake or biased information on algorithm-driven online platforms tend to get stronger sectarian biases. Such results align with the findings of prior studies that suggest the existence of informational echo-chambers that can be formed with the help of algorithmic-based content curation and support the pre-existing beliefs and biases (Cinelli et al., 2021). Equally, Bakshy et al. (2015) also showed that social media platforms can restrict the exposure to various perspectives through algorithmic filtering which reinforces ideological polarization.

Considering the situation in Pakistan where religious identity is a key aspect of social and cultural life, group-based stories where out-groups are dangerously viewed as inferior and morally superior may be enhanced by exposure to sectarian misinformation. The recent results correspond with the studies of Sunstein (2017), who stated that the digital environment relying on algorithms can have polarizing effects in groups as people are constantly shown the information that can reinforce their pre-existing beliefs. The other significant result of the research was the inverse proportionality of critical thinking and sectarian attitudes. Respondents that exhibited greater critical thinking scores were less prone to promoting sectarianism. The result is consistent with earlier studies that propose the idea of critical thinking skills as a protective factor in helping to avoid vulnerability to misinformation and ideological manipulation (Facione, 2015). People with high critical thinking skills can better judge the validity of sources of information and false accounts. Thus, they will not believe in misinformation easily.

Moreover, mediation analysis also showed that critical thinking partially mediated the relationship between the exposure to algorithmic misinformation and sectarian attitudes. It indicates that the negative effect of misinformation could be indirectly applied to the sectarian attitude because of the undermined ability of people to evaluate information critically. Exposure to emotionally evoking or biased information repeatedly can lead to a more heuristic and less analytical cognitive processing because people are more susceptible to misinformation (Pennycook and Rand, 2019).

The researchers determined also that the association between exposure to algorithmic misinformation and sectarian attitudes was strongly moderated by the strength of social identity. Particularly, the connection between misinformation exposure and sectarian attitudes was more pronounced among the people who said that they feel stronger belonging to their religious group. This observation is in line with the Social Identity Theory that holds that people attain some sense of self through being part of social groups and tend to pursue positive distinctiveness of their in-group (Tajfel and Turner, 1979). As people identify

strongly with a certain religious or sectarian group, they might be more open to narratives that support them in-group superiority or the representation of out-groups negatively.

Such results might also be evidenced by another research by Hogg (2016), who insinuates that strong group identification may enhance the level of intergroup biases and predisposition to ideological narratives that enhance the strength of group boundaries. In cyberspace where algorithms are used to organize content, these types of narratives can be viral and potentially enhance the sectarian divide. Comprehensively, the findings indicate that there is a multifaceted interaction among technological systems, cognitive processes and social identity processes in the development of intergroup attitudes among young people in Pakistan.

5.1 Theoretical Implications

The current research paper will be added to the existing literature in the field of interdisciplinary research between social psychology, media psychology, and digital communication. First, the results elaborate on the Social Identity Theory and show that algorithmic misinformation may be used with social identity processes to condition sectarian attitudes online. Second, the research paper adds to the research body on misinformation by bringing out the mediating position of critical thinking. Although it has been established in previous studies that misinformation can act on beliefs and attitudes, the findings presented herein positively indicate that, cognitive abilities like critical thinking might have a significant influence as a psychological process that alleviates the rate of influence. Third, the research incorporates the views of both algorithmic communication and social psychology by showing how the AI-inspired information systems can affect the social attitudes using both cognitive and identity-based processes.

5.2 Practical Implications

The results of the current study have a number of significant practical consequences to the policy makers, educators and technology platforms. To start with, the learning institutions must focus on the need to develop critical thinking and media literacy in the university students. Algorithms Training interventions emphasizing the assessment of digital information sources and detection of misinformation can be used to lessen the vulnerability to algorithmically amplified misinformation. Second, social media platforms and tech firms ought to think of having more stringent measures aimed at curbing dissemination of algorithmic falsehoods, especially ones that encourage sectarian or religious bigotry. Algorithms practices have the potential to be more transparent and better fact-checking systems can be developed in order to reduce the detrimental impact of misinformation. Third, digital literacy can be included in national education policies in Pakistan to benefit the policymakers. These efforts might be significant to enhance social harmonies and eliminate intergroup stress in a society that is digitally interconnected. Lastly, the civil society organizations and religious authorities could have a part in advancing intergroup dialogue and overcoming the narrative of misinformation which would lead to sectarian polarization.

5.3 Limitations of the Study

Regardless of its efforts, the current study has a few limitations, which are worth mentioning. First, the research used a cross-sectional research design, which restricts the researcher to come up with causal conclusions on the relationships among the variables. Longitudinal or experimental designs can be useful in future researches to better identify causal relationships. Second, the research was based on self-report measures, which could have been affected by social desirability bias. There is the possibility that participants under report socially undesirable beliefs like sectarian prejudice. Third, the sample size was mainly based on the students of the university in Punjab, Pakistan. Although the population is very much relevant in the study of the usage of digital media, the results might not be easily generalized to other age groups as well as regions. Lastly, the research was narrow on few

psychological variables. Sectarian attitudes can also be influenced by other factors like political ideology, religiosity and emotional reactions about misinformation that require further investigation.

5.4 Future Research Directions

The current study can be advanced in various significant manners in future studies. First, longitudinal research might focus on the way the attitude-based intergroup responses to the long-term exposure to algorithmic misinformation changes. This study can give more information about the impact of digital misinformation over time. Second, to establish the effect of algorithmic narrative on sectarian attitudes and identity processes, experimental studies may control exposure to various forms of online content. Third, studies conducted in the future may examine other mediating variables like emotional arousal, perceived threat, or moral outrage, which may be the reason behind the manipulation of attitudes by misinformation. Fourth, cross-cultural comparative studies can be done to answer the question of whether identical psychological mechanisms can be applied to other countries that are characterized by the religious or ethnic divides. Lastly, the role of new technologies like generative AI and deepfake media in influencing social attitudes and intergroup relations can also be studied in the future.

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