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The effect of cross-cutting exposure on attitude change: examining the mediating role of response behaviors and the moderating role of openness to diversity and social network homogeneity

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ABSTRACT

Using nationally representative data in Taiwan, this study investigated the effect of cross-cutting exposure on social media on attitudinal change. Findings showed that the way people responded to political disagreement on social media matters. People's attitudes were likely to change when they checked cross-cutting information and expressed opinion after being exposed to it, but not when they ignored the disagreeing information after the exposure. Accordingly, checking disagreeing information and expressing opinion played a significant role in mediating the relationship between exposure to cross-cutting information and attitude change. More importantly, the indirect effect of cross-cutting exposure on attitude through information checking was contingent on the levels of individuals' openness to diversity and social network homogeneity. The indirect effect was strengthened when the level of openness to diversity was higher but weakened when the level of social network homogeneity was higher. Implications of the findings are discussed.

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Scholars have long debated the effects of exposure to cross-cutting perspectives on the development of a healthy democratic society (Gutmann & Thompson, 1996). Exposure to cross-cutting perspectives plays an essential role in contributing to deliberative democracy as it encourages people to learn from diverse perspectives and seek out additional information (Chen, 2017; Mutz, 2002; Mutz & Mondak, 2006) and prompts political discussions both online and offline (Kim & Chen, 2016; Shah et al., 2001). Although cross-cutting exposure may backfire through solidifying people's preexisting beliefs by motivating them to argue against the oppositional perspective, the process of deliberating has great potential to enhance mutual respect and reduce differences of opinion (Gutmann & Thompson, 1996).

The increasing popularity of Internet use and mobile technology has raised questions about the role of social media in facilitating cross-cutting exposure. Researchers have found that using social media increases the chances of exposure to diverse political views and therefore contributes to cross-cutting exposure (Chen et al., 2021; Heatherly

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et al., 2017; Kim, 2011). Among individuals' online social networks, the mixture of strong-tie and weak-tie relationships provides opportunities for users to interact with people from diverse backgrounds, which in turn extends cross-cutting exposure among shared connections (Lee, Choi, Kim, & Kim, 2014). In addition, social media integrates links and contact lists from external sources, further increasing the chances of encountering others with substantively different worldviews (Brundidge, 2010). Incidental exposure to political news on social media can also promote cross-cutting exposure for people who are not interested in politics (Heatherly et al., 2017). The ease of accessing cross-cutting exposure on social media means that it is important to understand how and under what conditions this exposure can facilitate attitude change as an outcome of political persuasion (Barnidge, Gil de Zúñiga, & Diehl, 2017; Diehl, Weeks, & Gil de Zúñiga, 2016).

In this study, we first acknowledge the direct effect of cross-cutting exposure on attitude change and further examine the *indirect* effect of cross-cutting exposure on attitude change by proposing different types of responses to cross-cutting exposure (i.e. information checking, opinion expression, and ignoring information) as mediators. The types of responses represent different levels of engagement with cross-cutting information, which could potentially contribute to individuals' attitude change. Second, we propose openness to diversity and social network homogeneity as conditional factors in the indirect effect of cross-cutting exposure on attitude change. Openness to diversity and social network homogeneity represent individual and structural factors that tap into the level of diversity and can influence how people respond to cross-cutting exposure. Taking the proposed relationship together, this study proposes a moderated mediation model (Figure 1) to provide insight into how cross-cutting exposure on social media influences individuals' attitudes.

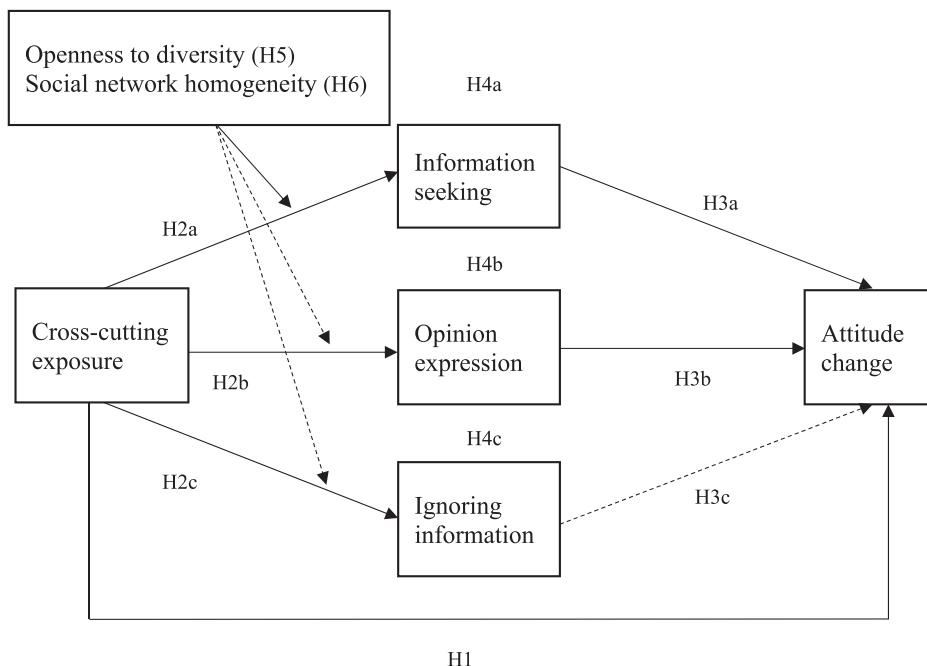


Figure 1. The final moderated mediation model.

We tested the proposed model with a nationally representative sample in Taiwan. Cross-cutting exposure is important in Taiwan firstly because Taiwan has a comparatively higher level of democracy and media freedom among countries in Asia. According to Freedom House (2021), Taiwan has a democratic political system and with a high freedom score. In addition, the penetration rate of social media is high. According to Newman et al. (2021), more than two-thirds of Taiwanese use social media (e.g. Line, Facebook, and YouTube). The democratic political system, free media production and high-level social media usage together make cross-cutting exposure a promising feature of Taiwanese people's daily media consumption, which will likely result in attitudinal change.

Exposure to cross-cutting perspective and attitude change

Cross-cutting exposure refers to exposure to rationales of conflicting political views (Mutz, 2002). Although people tend to consume information that reinforces their existing worldviews (i.e. selective exposure; Klapper, 1960), this is not necessarily equivalent to avoiding cross-cutting perspectives (Garrett, 2009; Garrett & Stroud, 2014). In online settings, users can seek a variety of opinions to increase their knowledge about an issue (Garrett, 2009). In addition, if users expect that information would be beneficial to them, they will be less concerned with whether the message agrees with their previous beliefs (Knobloch-Westerwick & Johnson, 2014). Cross-cutting exposure is a core element of effective deliberation as it influences individuals' ability to accept attitude-challenging information and views (Garrett, 2009). Deliberative theorists suggest that cross-cutting exposure makes individuals more familiar with opposing views and increases their political tolerance (Mutz, 2002). It can also stimulate positive political engagement, such as information seeking, checking, and processing of alternative views (Delli Carpini, Cook, & Jacobs, 2004; Mendelberg, 2002). Put generally, cross-cutting exposure has the potential to lead to more balanced political attitudes and depolarize opinions (Barabas, 2004; Mutz, 2002).

Empirical research has drawn mixed conclusions on the polarizing and depolarizing effects of cross-cutting exposure. One camp argues that instead of reducing extreme attitudes, being exposed to cross-cutting perspectives increases extremism (Bail et al., 2018; Binder, Dalrymple, Brossard, & Scheufele, 2009; Lee et al., 2014). People who are exposed to messages that conflict with their own attitudes are prone to counterargue them using motivated reasoning, which accentuates perceived differences between groups and increases their commitment to preexisting beliefs (Bail, 2014; Nyhan & Reifler, 2010; Taber & Lodge, 2006). Cross-cutting exposure may thus backfire and exacerbate political polarization.

In contrast, many previous studies among the other camp have provided supportive evidence that cross-cutting exposure on social media plays a significant role in political persuasion and attitude change (Boxell, Gentzkow, & Shapiro, 2017; Garimella, Morales, Gionis, & Mathioudakis, 2017). For example, Kobayashi (2020) found that the political use of social media depolarizes the attitudes of those who have a dual identity of Hong Kongese and Chinese because the multiple identities motivate people to have more exposure to cross-cutting perspectives, which decreases attitudinal polarization.

There are two possible reasons for the depolarizing effects of cross-cutting exposure on social media. First, social media can facilitate connections between weak ties (Bakshy, Rosenn, Marlow, & Adamic, 2012) and bridge heterogeneous networks (Garnmella et al., 2017), helping users experience more exposure to cross-cutting perspectives and reduce political extremism. Furthermore, as social media potentially motivates people to cultivate and maintain social networks with members from various backgrounds, such diversity tends to lead users to be less rigid in their views (Binder et al., 2009). Second, online social networks can serve as a basis for evaluating individual opinions and their prevalence (Moscovici, 1985). According to Wojcieszak and Price (2009), cross-cutting exposure is likely to offer a salient counterweight to personal opinion projection and demonstrates to people that their prior views are not as prevalent in the population as they believed. Cross-cutting exposure can also render the cross-cutting views readily retrievable from memory and decrease the likelihood of strengthening prior views. In this vein, we expect that cross-cutting exposure on social media will lead to attitude change:

Hypothesis 1: Cross-cutting exposure on social media is positively related to attitude change.

Despite the important contributions of the studies described above, how cross-cutting exposure can lead to attitude change has not yet been fully explored. It is also possible that people's political attitude may not be affected by cross-cutting exposure if they are not paying attention to the information or if their attitude becomes ambivalent and they do not want to take a stance. Recently, scholars have strived to understand the indirect effect of media use on attitude and behavior by examining the mediators of personal-psychological factors (e.g. political efficacy) and interpersonal communication behaviors (e.g. political discussion; Cho et al., 2009; Shah, Cho, Eveland, & Kwak, 2005). For instance, through an analysis of Pew Research Center national survey data collected in 2012, Lee and Myers (2016) found that cross-cutting exposure leads to changes in one's political view or behavior only when it is followed by cross-cutting discussion. People respond to cross-cutting perspectives differently, and how they respond may play a role in influencing their attitudes. As suggested by Choi (2021), cross-cutting exposure can be multidimensional, including cross-cutting scanning (e.g. encountering cross-cutting perspectives and simply ignoring them), cross-cutting integrating (e.g. processing both sides of opposing views), and cross-cutting interacting (e.g. expression of opinions via posting). The experiences of these subdimensions yield distinctive levels of information engagement, which would produce differential effects on attitude change. To understand the indirect effect of cross-cutting exposure on attitude change, this study proposes three types of response to cross-cutting exposure: information checking, opinion expression, and ignoring information.

The mediating role of different types of responses to cross-cutting exposure

After exposure to cross-cutting information, people may react in different ways. In general, they may process it actively, such as by checking information or expressing an opinion, or passively by simply ignoring it (Eagly, Kulesa, Brannon, Shaw, & Hutson-Comeaux, 2000). They may respond carefully to cross-cutting perspectives and process them systematically because arguments that are not congenial to their attitudes are

likely to be scrutinized for a longer time than congenial ones (Chaiken, Liberman, & Eagly, 1989). According to the information processing theory (Simon, 1978), human behavior can be explained as a reflection of the information-processing system. Within the information-processing process, people manipulate information, monitor it, and then strategize about it. Being exposed to cross-cutting information may prompt individuals' demand for additional information given that they will need more resources to reflect about their own political standpoints and beliefs (Matthes et al., 2019). Therefore, cross-cutting exposure could increase information-checking behavior.

As one of the responses to cross-cutting exposure, information-checking refers to efforts to examine and verify the correctness of the encountered information (Zhang & Li, 2020). When cross-cutting exposure prompts an ambivalent attitude, people may check the information about which they are uncertain in order to make proper judgements. Information checking, therefore, implies a certain amount of information-seeking behavior to check the encountered information. While checking the information, people could search for more opinions from the other side to learn about aspects of an issue they previously had not taken into consideration (Mutz, 2002).

After processing the additional information while checking information, people return to the cross-cutting perspectives and make judgements about their correctness. As a part of deliberation, checking cross-cutting information helps to counteract individual biases (Mercier & Landemore, 2012). Put simply, deliberative engagement may correct for information deficits and erroneous perceptions, making individuals more familiar with opposing views (Dryzek, 2000). This, in turn, should facilitate more reasoned opinions and attitude adjustment (Nordbrandt, 2020). Therefore, information-checking behavior could make one's attitude become less extreme, representing a change in attitude as well.

Another type of active response, opinion expression, may also occur after encountering cross-cutting information. According to Scheufele (1999), opinion expression and political talk are the two dimensions of political discussion. Differing from the emphasis on a rational exchange of arguments about an issue in political talk, opinion expression refers to publicly expressing opinions about a political issue in potentially hostile settings. This concept has been widely discussed in the study of the spiral of silence theory (Noelle-Neumann, 1974).

Opinion expression can be triggered by cross-cutting exposure. The first possible mechanism is that cross-cutting exposure can stimulate internal deliberation, which then increases people's argument repertoire (Schneider & Weinmann, 2021). In other words, cross-cutting information makes people reflect not only on their own but also others' opinions, leading them to find more arguments. With more arguments in mind, individuals are more willing to express their own opinions. The second possible mechanism is that cross-cutting exposure provides an environment for heterogeneous discussion, which could increase people's willingness to express their opinions and engage in discussion as an on-going process (Lee & Myers, 2016).

In addition, many previous studies considered opinion expression to be a type of political participation. For instance, 'posting or reposting political contents and links for sharing' online and 'discussing and advancing issue positions' offline are included in the measurement of political participation, and the measure was found to be positively

related to cross-cutting exposure (Min & Woh, 2018, p. 27). Social media as a sphere for political expression has the potential to promote opinion exchanges among people with dissimilar views, which may increase the chance of being persuaded by those with opposite viewpoints and eventually adjusting one's own views. Thus, cross-cutting opinion expression should facilitate attitude change and depolarized opinions (Lee & Myers, 2016; Nordbrandt, 2020).

People may also react passively toward cross-cutting perspectives. They may ignore or screen out cross-cutting perspectives due to the discomfort created by the dissonant information (Eagly & Chaiken, 1995). Thus, uncongenial information may be less likely to be rehearsed because of its unpleasantness or threat to existing attitudes. For instance, Lee and Myers (2016) found that 67.5% of their respondents chose 'ignore the post' when one of their friends posted something about politics that they disagreed with. If they do not process counter-attitudinal information actively, individuals are less likely to change their attitude.

This study hypothesizes that cross-cutting exposure could lead to three different responses. The two active responses (i.e. information checking and opinion expression) are positively related to attitude change, while the passive one (i.e. ignoring information) is negatively related to attitude change. Given the proposed direct relationships, this study also proposes that the relationship between cross-cutting exposure and attitude change is mediated by the three types of responses toward cross-cutting perspectives. The following hypotheses are proposed:

Hypothesis 2: Exposure to cross-cutting perspectives is positively related to (a) cross-cutting information checking, (b) cross-cutting opinion expression, and (c) ignoring cross-cutting information.

Hypothesis 3a: Cross-cutting information checking is positively related to attitude change.

Hypothesis 3b: Cross-cutting opinion expression is positively related to attitude change.

Hypothesis 3c: Ignoring cross-cutting information is negatively related to attitude change.

Hypothesis 4: (a) Cross-cutting information checking, (b) cross-cutting opinion expression, and (c) ignoring cross-cutting information mediate the relationship between exposure to cross-cutting perspective and attitude change.

The moderating role of openness to diversity and social network homogeneity

While cross-cutting exposure plays a significant role in the development of deliberative democracy, the way it influences attitude change through different responses may be conditional upon different factors. This study focuses on individual and structural factors that tap into the level of diversity, which could affect the mediating relationship. Studies have demonstrated that individual traits and network structure both play significant roles in influencing how people react to different information and behave on social media (Kim & Chen, 2015; Lee et al., 2014). Accordingly, we examine openness to diversity (i.e. an individual factor) and social network homogeneity (i.e. a structural factor) to understand how they moderate the influence of exposure to counter-attitudinal information on responses to the information, which in turn may change individuals' attitude.

Openness to diversity

Deliberation highlights equality as a normative characteristic so that discourse involving certain viewpoints is not lacking or otherwise suppressed (Sanders, 1997). While cross-cutting exposure is important in the deliberation process, discussion participants also need to be open to letting all viewpoints be presented and to engage in attentive listening or dialogue. Being deliberative implies being open to suggestions, willing to consider diverging viewpoints, and prepared to reevaluate an opinion in light of new evidence (Chambers, 1996; Weithman, 2005).

Political openness is citizens' propensity for public dialogue with lesser-known others. Cross-cutting discussion is positively related to dialogic openness (Kwak et al., 2021; Lee et al., 2015) because people with high openness are more willing than those with low openness to share their views and be honest even in uncertain public opinion climates. Accordingly, people with high openness to diversity should be more likely to actively engage with cross-cutting information, such as checking information or expressing opinion when encountering cross-cutting information. It is also reasonable that people with low openness to diversity should be more likely to ignore diverse opinions different from their own. Therefore, we hypothesize that openness to diversity will strengthen the indirect effect of cross-cutting exposure on attitude change through two active responses to cross-cutting information (information checking and opinion expression). However, openness to diversity will weaken the indirect effect by ignoring cross-cutting influence. We propose:

Hypothesis 5a: The indirect effect of cross-cutting exposure on attitude change through cross-cutting information checking is *strengthened* when the level of openness to diversity is higher.

Hypothesis 5b: The indirect effect of cross-cutting exposure on attitude change through cross-cutting opinion expression is *strengthened* when the level of openness to diversity is higher.

Hypothesis 5c: The indirect effect of cross-cutting exposure on attitude change through ignoring cross-cutting information is *weakened* when the level of openness to diversity is higher.

Social network homogeneity

Differing from cross-cutting exposure, which focuses on the frequency of exposure to dissimilar views, social network homogeneity describes the characteristics of an individual's social network. In the present study, social network homogeneity describes the extent to which individuals perceive their online social networks to be similar to themselves. This method of measuring network homogeneity is similar to methods used in prior studies (e.g. Mutz, 2002; Neo, 2021). From the perspective of network structure, social network homogeneity indicates the extent to which one's personal network on social media is limited in terms of diversity and functions as a basis for repeated exposure to like-minded information (Granovetter, 1973; McPherson, Smith-Lovin, & Cook, 2001). As such, like-minded information serves as a crucial resource for consolidating one's political views. Strong-tie homogeneity is directly linked to robustness of attitude and political polarization (e.g. McPherson et al., 2001). In addition, a homogenous discussion network is closely intertwined with attitude polarization (Huckfeldt, Mendez, & Osborn,

2004). Therefore, social network homogeneity may decrease the effect of cross-cutting exposure on willingness to engage in cross-cutting information, which would further inhibit attitude change.

According to the spiral of silence theory, individuals tend to avoid voicing a minority opinion publicly, due primarily to a fear of isolation (Noelle-Neumann, 1974). In other words, the nature of social networks and opinion climates will influence individuals' willingness to express (Chen, 2018; Glynn, Hayes, & Shanahan, 1997). Thus, individuals are less likely to engage with cross-cutting information in a homogenous network because of the fear of isolation. The more homogeneous the network, the less likely individuals will be to speak up in an online political forum when encountering disagreement (Chan, 2018). Put generally, individuals with higher levels of social network homogeneity should be less likely to actively engage with cross-cutting information. Instead, they are more likely to have passive responses. With a more homogeneous social network, people will be more likely to ignore the cross-cutting information and choose to keep silent.

Therefore, we expect that social network homogeneity will weaken the indirect effect of cross-cutting exposure on attitude change through information checking and opinion expression, but it will strengthen the indirect effect through ignoring cross-cutting information. Specifically:

Hypothesis 6a: The indirect effect of cross-cutting exposure on attitude change through cross-cutting information checking is *weakened* when the level of social network homogeneity is higher.

Hypothesis 6b: The indirect effect of cross-cutting exposure on attitude change through cross-cutting opinion expression is *weakened* when the level of social network homogeneity is higher.

Hypothesis 6c: The indirect effect of cross-cutting exposure on attitude change through ignoring cross-cutting information is *strengthened* when the level of social network homogeneity is higher.

Method

Data

The data for this study were drawn from the 2018 political polarization survey conducted by the Taiwan Institute for Governance and Communication Research (TIGCR-PPS2018). The face-to-face survey was conducted from July 9 to November 23, 2018, in Taiwan, with a total of 2,484 representative respondents aged 18 years and older. The sample matched the national census population in terms of demographic breakdown. The survey consisted of questions regarding media use and political discussion, political attitude, and political behaviors.

Measures

Cross-cutting exposure

Following Mutz (2006)'s measurement, respondents were asked how often they encounter political information on social media that is different from their political views on a scale from 1 = never to 5 = always ($M = 2.80$, $SD = .88$).

Responses to cross-cutting exposure

Information checking was measured with two items asking on a scale from 1 = never to 5 = always how often respondents (1) check information that is different from their political views on other websites or social media and (2) verify if the disagreeing information is true or not ($M = 2.01$, $SD = .89$, Spearman-Brown Coefficient = .75). Opinion expression was measured with one item asking how often respondents express their opinion when they encounter political information that is different from their perspective on social media on a scale from 1 = never to 5 = always ($M = 1.53$, $SD = .74$). Ignoring information was measured with one item asking how often respondents ignore the cross-cutting information they encounter from 1 = never to 5 = always ($M = 4.25$, $SD = 1.02$).

Attitude change

Attitude change is conceptualized as the outcome of political persuasion in a depolarized direction. Previous studies (Barnidge et al., 2017; Diehl et al., 2016) measured political persuasion by asking how often the respondents reconsidered or changed their political views based on information they encountered. Following this approach, respondents were asked how often they change their political perspective or position because of the disagreeing information they encounter on a scale of 1 = never to 5 = always ($M = 2.08$, $SD = .85$).

Openness to diversity

Respondents indicated their level of agreement on a scale from 1 = strongly disagree to 5 = strongly agree with two statements that capture individuals' behavioral and perceived level of openness (Hobman, Bordia, & Gallois, 2004): (1) I take different political perspectives into consideration when I encounter a different political perspective and (2) I have a better understanding of political issues when I encounter different political perspectives ($M = 3.56$, $SD = .74$, Spearman-Brown Coefficient = .74).

Social network homogeneity

Social network homogeneity captures the online network structure and the extent to which individuals perceive their online social networks to be similar to themselves. To measure this, respondents were asked to indicate the extent to which the political information they encounter on social media is similar to or different from their political perspectives. The answers are 1 = all different, 2 = mostly different, 3 = half similar and half different, 4 = mostly similar, and 5 = all similar. Higher values represent greater homogeneity ($M = 2.98$, $SD = .62$).

Controls

This study controls a host of variables in the analysis, including demographic characteristics, news media use, and political predisposition, to avoid confounding effects on the proposed relationships. Demographic variables include age ($Mdn = 40\text{-}49$, $SD = 1.71$), gender (male = 53.5%), education (Mdn = high school and higher vocational, $SD = 1.58$), and household monthly income ($Mdn = \$49,001\text{--}59,000$, $SD = 2.79$). Political interest ($M = 1.99$, $SD = .82$), political ideology (pan-blue coalition = 22.1%; neutral = 56%; pan-green coalition = 21.9%), and party strength ($M = 2.05$; $SD = 1.39$) were measured to tap into individuals' political predispositions. The frequency of offline political discussion ($M = 1.69$, $SD = .82$) was also measured (see Appendix A for detailed measurement).

Statistical analysis

The PROCESS macro (Hayes, 2018) was used to examine the relationship. First, the Model 4 template with 10,000 bias-corrected bootstrap resamples and 95% confidence intervals (CIs) was adopted to examine the direct and indirect relationships (H1, H2, and H3). Then, the Model 9 template was used to investigate the moderating roles of openness to diversity (H4) and social network homogeneity (H5) in influencing the indirect effect of cross-cutting exposure on attitude change. Statistical significance ($p < .05$) is achieved when lower bound (LL) and upper bound (UL) CI do not include zero.

Results

Direct and indirect effects: the mediation model

Table 1 illustrates the regression analyses in the mediation and moderated mediation models from the PROCESS macro. As shown in Table 1, cross-cutting exposure is positively related to attitude change (Model 4: $B = .12$, standard error [SE] = $.04$, $p < .01$). Hypothesis 1 is thus supported. Cross-cutting exposure is also positively related to cross-cutting information checking (Model 1: $B = .16$, $SE = .04$, $p < .001$), opinion expression (Model 2: $B = .08$, $SE = .03$, $p < .05$), and ignoring cross-cutting information (Model 3: $B = .10$, $SE = .05$, $p < .05$). The results support H2. For the three different responses to cross-cutting exposure, information checking (Model 4: $B = .26$, $SE = .05$, $p < .001$) and opinion expression (Model 4: $B = .15$, $SE = .05$, $p < .01$) are positively related to attitude change; however, ignoring cross-cutting information is not significantly related to attitude change (Model 4: $B = .00$, $SE = .03$). The results support H3a and H3b but not H3c. The bootstrapping mediation analysis in Table 2 shows that the indirect effect of cross-cutting exposure on attitude change through information checking ($B = .042$, $SE = .011$, 95% CI = [.022, .067]) and opinion expression ($B = .012$, $SE = .006$, 95% CI = [.002, .024]) is significant, but the indirect effect through ignoring information is not ($B = .000$, $SE = .004$, 95% CI = [-.008, .008]). H4a and H4b are supported, but H4c is not supported.

The conditional indirect effect

The moderated mediation analysis further illustrates how openness to diversity and social network homogeneity moderate the indirect effect (H5). In Table 1, Model 1A, Model 2A, and Model 3A present the three regression models from PROCESS that are used to examine how the two moderators moderate the paths from the IV (i.e. cross-cutting exposure) to the mediators (i.e. information checking, opinion expression, ignoring information; see Figure 1). The results show that openness to diversity significantly moderates the effect of cross-cutting exposure on information checking by enhancing the relationship (Model 1A: $B = .12$, $SE = .05$, $p < .05$), supporting H5a. However, openness to diversity does not significantly moderate the effect of cross-cutting exposure on opinion expression (Model 2A: $B = -.02$, $SE = .04$) or on ignoring cross-cutting information (Model 3A: $B = -.05$, $SE = .07$). H5b and H5c are not supported.

Similar to openness to diversity, social network homogeneity significantly moderates the relationship between cross-cutting exposure and cross-cutting information checking, but in the opposite direction (Model 1A: $B = -.12$, $SE = .05$, $p < .05$). In other words, social

Table 1. Regressions for the Mediation Models and the Moderated Mediation Models.

	Information checking (Mediator)		Opinion expression (Mediator)		Ignoring information (Mediator)		Attitude change (Criterion)
	Model 1	Model 1A	Model 2	Model 2A	Model 3	Model 3A	Model 4
Predictors and mediators							
Cross-cutting exposure	.16 (.04)***	.09 (.24)	.08 (.03)*	.08 (.22)	.10 (.05)*	.43 (.32)	.12 (.04)**
Information checking							.26 (.05)***
Opinion expression							.15 (.05)**
Ignoring information							.00 (.03)
Moderator							
Openness to diversity	.20 (.05)***	-.13 (.14)	.09 (.05)*	.13 (.13)	-.06 (.07)	.08 (.19)	.20 (.05)***
Social network homogeneity	-.01 (.05)	.31 (.15)*	.04 (.05)	-.01 (.14)	-.02 (.07)	.11 (.20)	-.02 (.05)
Interactions							
Cross-cutting exposure x Openness to diversity		.12 (.05)*		-.02 (.04)		-.05 (.07)	
Cross-cutting exposure x Social network homogeneity		-.12 (.05)*		.02 (.05)		-.05 (.07)	
Control variables							
Female	.03 (.06)	.04 (.06)	-.01 (.06)	-.01 (.06)	.03 (.09)	.01 (.09)	.06 (.07)
Age	-.08 (.03)***	-.08 (.03)***	-.05 (.02)*	-.05 (.02)*	.02 (.04)	.02 (.04)	-.11 (.03)***
Education	.07 (.03)*	.06 (.03)*	-.00 (.03)	-.00 (.03)	.05 (.04)	.06 (.04)	.01 (.03)
Income	-.00 (.01)	.00 (.01)	-.02 (.01)	-.02 (.01)	-.02 (.02)	-.02 (.02)	-.00 (.01)
Political ideology	.04 (.05)	.04 (.05)	-.02 (.04)	-.02 (.04)	.03 (.06)	.03 (.06)	.04 (.05)
Party strength	-.01 (.03)	-.01 (.03)	.00 (.02)	.00 (.02)	-.01 (.03)	-.01 (.03)	-.01 (.03)
Political interest	.18 (.05)***	.19 (.05)***	.14 (.04)***	.14 (.04)***	-.13 (.06)*	-.13 (.06)*	-.02 (.05)
Political discussion	.19 (.04)***	.19 (.04)***	.18 (.04)***	.18 (.04)***	.03 (.06)	.03 (.06)	.08 (.05)
Constant	-.28 (.31)	-.07 (.68)	.48 (.28)	.48 (.63)	4.13 (.41)***	3.26 (.92)***	.46 (.35)
R ²	.24***	.26***	.14***	.14***	.02	.02	.27***

Note: Entries are final unstandardized regression coefficients. Standard errors in parentheses. * $p < .05$; ** $p < .01$; *** $p < .001$.

network homogeneity weakens the relationship between cross-cutting exposure and cross-cutting information checking, supporting H6a. However, social network homogeneity does not moderate the effect of cross-cutting exposure on opinion expression (Model 2A: $B = .02$, $SE = .05$) or on ignoring information (Model 3A: $B = -.05$, $SE = .07$). H6b and H6c are not supported.

Table 3 reports varying degrees of indirect effects on attitude change depending on the level of openness to diversity and social network homogeneity. The bootstrapped 95% bias-

Table 2. Indirect Effects of Cross-Cutting Exposure on Attitude Change.

	Indirect Effects of Cross-Cutting Exposure on Attitude Change	Effect	SE	Bootstrap 95%CI	
				LL	UL
Total			.054	.015	.027 .084
Ind1	Cross-cutting exposure → Information checking → Attitude change	.042	.012	.022	.067
Ind2	Cross-cutting exposure → Opinion expression → Attitude change	.012	.006	.002	.024
Ind3	Cross-cutting exposure → Ignoring information → Attitude change	.000	.004	-.008	.008

Note: Statistical significance (* $p < .05$) is achieved when lower bound (LL) and upper bound (UL) CI does not include zero.

Table 3. Conditional Indirect Effects of Cross-Cutting Exposure on Attitude Change through Information Checking Moderated by Openness to Diversity and Social Network Homogeneity.

Mediator: Information checking					
Moderator:				Bootstrap 95% CI	
Openness to diversity	Social network homogeneity	Effect	SE	LL	UL
Low (2.99)	Low (2.32)	.047	.014	.023	.076
Low	Mean (2.95)	.025	.010	.007	.047
Low	High (3.58)	.003	.013	-.023	.030
Mean (3.66)	Low	.070	.016	.042	.104
Mean	Mean	.048	.013	.026	.076
Mean	High	.026	.015	-.001	.059
High (4.33)	Low	.094	.022	.055	.140
High	Mean	.072	.019	.038	.113
High	High	.049	.021	.013	.095

Indices of partial moderated mediation	Index	SE	LL	UL
Openness to diversity	.035	.013	.011	.063
Social network homogeneity	-.035	.014	-.065	-.009

Note: Conditional effects represent specific indirect effects at different values of both moderators based on 95% bias-corrected bootstrap confidence interval (CI; 10,000 samples). Statistical significance (* $p < .05$) is achieved when lower bound (LL) and upper bound (UL) CI does not include zero. Mean, high, and low represent mean and $+/-1$ standard deviation, respectively.

corrected confidence intervals suggest that the indirect effect of cross-cutting exposure on attitude change through information checking is significant at different levels of openness to diversity and is enhanced when the level of openness to diversity is increased. However, the indirect effect is only significant when respondents have a low or middle (as opposed to high) level of social network homogeneity, and the indirect effect becomes weaker when the level of homogeneity increases. The indices of partial moderated mediation show a significant moderated mediation model (openness to diversity: index = .035, SE = .013, 95% CI = [.011, .063]; social network homogeneity: index = -.035, SE = .014, 95% CI = [-.065, -.009]). Figure 1 illustrates the final moderated mediation model.

Discussion

Social media has become one of the most common pathways where people get their political information. With the proliferation of social media platforms, scholars have been debating to what extent social media is beneficial or detrimental to the development of deliberative democracy. While some scholars consider social media to be an echo chamber because of the ideologically homogeneous network it can promote (Bail et al., 2018; Himelboim, McCreery, & Smith, 2013), others argue that social media could facilitate cross-cutting exposure because of the diverse information it makes available and its weakened social and geographical boundaries (Brundidge, 2010; Kim, 2011). However, there have been mixed findings regarding how cross-cutting exposure affects attitudinal outcomes given that cross-cutting exposure represents the critical element of deliberation, but it also may boomerang and further polarize political attitudes (Valentino, Banks, Hutchings, & Davis, 2009). This study proposed that there could be uneven engagement with cross-cutting information on social media after people are exposed to different political perspectives, which would further affect their attitudes. This

relationship also depends on individual and structural factors that are related to the level of diversity.

Findings from this study first suggest that cross-cutting exposure can lead people to active or passive behavioral outcomes. The findings echo Choi (2021)'s argument that cross-cutting exposure should not be a single dimension as it involves a subsequent reaction in response to the counter-attitudinal information. It is possible that people will dismiss counter-attitudinal information due to cognitive dissonance, and it is also possible that people will further engage with the information to understand more about the opposite viewpoints. We identify the active and passive dimensions of response behaviors and argue that different responses matter in terms of the extent to which people change their attitude.

Among the three different responses to cross-cutting information, information checking and opinion expression contribute to attitude change. Both behaviors represent an internal and an external cognitive reasoning process whereby people actively approach disagreeing information for different reasons, such as to develop evaluative disposition, make decisions, learn how to take action, or defend their own position (Atkin, 1973). Through continuous engagement with cross-cutting information, people may consider different perspectives when making a decision and have a more balanced judgment. Thus, cross-cutting information checking and opinion expression facilitate attitude change.

The results further support that the two active responses to cross-cutting information (i.e. information checking and opinion expression) mediate the relationship between cross-cutting exposure and attitude change. More importantly, the indirect effect of cross-cutting exposure on attitude change through cross-cutting information checking depends on an individual and a structural factor that are related to the level of diversity. First, openness to diversity suggests the extent to which a person is willing to be open to and consider different viewpoints in a public dialogue. We consider this an individual factor and found that it significantly enhances the positive effect of cross-cutting exposure on information checking, which further encourages attitude change. When people are willing to listen to different political perspectives, they should be more likely to engage with cross-cutting information in order to understand political issues and obtain a more comprehensive perspective, which could make their attitudes less extreme. Thus, the significant moderating role of openness to diversity in the indirect effect indicates the optimistic potential of social media cross-cutting exposure in depolarizing users' political opinions.

At a network structural level, social network homogeneity represents the extent to which a person's social network is limited in terms of diversity. As another moderator, social network homogeneity plays the opposite role to openness to diversity. It weakens the effect of cross-cutting exposure on cross-cutting information checking, which further prevents attitude change. This finding resonates with the theoretical claims of the Spiral of Silence theory given that whether individuals continue to engage with cross-cutting information depends on the opinion climate. When people encounter disagreeing information and their networks are more homogeneous, they will be discouraged from further engaging with the information (Chan, 2018). Accordingly, people should be encouraged to be open-minded to different political viewpoints and to form more heterogeneous networks so that cross-cutting exposure can play a beneficial role in influencing their attitude and facilitating the development of deliberative democracy.

Before concluding the study, it is necessary to note its limitations. First, the use of cross-sectional samples means that we cannot make definitive claims about causal

relationships. There is a possibility of reverse causality. For instance, information checking and opinion expression online could also reversely lead to higher chances of cross-cutting exposure. We conducted a model comparison using structural equation modeling and found that our proposed model ($\chi^2 = .001$, $df = 1$, $p = .98$; CFI = 1.000, TLI = 1.061; RMSEA = .000, SRMR = .000; AIC = 8269.915, BIC = 8549.714) has a better fit than the model with reversed paths ($\chi^2 = .168.800$, $df = 11$, $p < .001$; CFI = .799, TLI = .085; RMSEA = .119, SRMR = .049; AIC = 10911.823, BIC = 11201.792).¹ Therefore, it is unlikely that the positive relationship between cross-cutting exposure and information checking/opinion expression online is due to the reverse causal relationship. The model comparison demonstrates that the hypothesized model is better in illustrating the direction of different paths. Nevertheless, future researchers could adopt multi-wave panel survey designs to overcome this limitation.

Second, several concepts, such as cross-cutting exposure, opinion expression, and attitude change, are measured using single questions, which is a limitation for secondary data analysis with nationally representative survey data collected by face-to-face interviews. Future researchers can develop measurements with higher reliability and validity.

Third, scholars have noted that the self-report measure of attitude change may not be precise because perceived attitude change may not reflect actual attitude change (Miller, McHoskey, Bane, & Dowd, 1993). Future researchers can conduct multi-wave panels or experiments to capture the actual changes in attitudes.

Fourth, the data were drawn from a nationally representative survey from Taiwan, so there may be variations when applying the relationships to countries with different political and media systems. In particular, as Taiwan has comparatively high levels of democracy and media freedom among countries in Asia, there may be variations when applying the tested model in other Asian countries with different political and media systems. This warrants more comparative study in other countries if we aim to further test and extend the model in a broader scope.

Last but not least, as the measurements applied in this study are all focused on general political cross-cutting exposure and political attitude change, the model can also be tested in issue-specific contexts and in various controversial social and health issues (e.g. housing policy, LGBT issues, or COVID-19 vaccination). As political attitudes are closely related to individuals' partisanship, attitudes on social and political issues may be more easily changed by cross-cutting exposure.

Despite the limitations, the relationships highlight the significant role of active responses to cross-cutting information, specifically cross-cutting information checking, that mediate the relationship between cross-cutting exposure and attitude change. Furthermore, openness to diversity and social network homogeneity play important roles affecting whether cross-cutting exposure would lead to attitude change, suggesting that it is necessary to consider individual and structural factors when discussing whether cross-cutting exposure in social media outlets contributes to deliberative democracy.

Note

1. The insignificant path between ignoring information and attitude change is released to free a degree of freedom for model fit calculation.



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No potential conflict of interest was reported by the author(s).

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