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How behavioral homophily on social media influences the perception of tie-strengthening within young adults' personal networks

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Abstract:

This study examines how social media and information-sharing behavior can influence young adults' perceptions of changes in tie strength within their own personal networks. By focusing on the extended personal networks (27.56 relationships) of young adults, we show that social media leads them to feel closer to their "friends" whom they think of as exhibiting online behaviors similar to their own. This behavioral homophily mainly stems from frequent reactions between friends, when they like or comment upon each other's posts. Such homophily is also related to the sharing of political news and entertaining content, which constitute a salient affordance in the "pervasive awareness" of social media and lead users to feel closer to those exhibiting similar content-sharing behavior. This similarity reveals how social media platforms help to shape personal networks over time, particularly by influencing user relationships with weak ties who share similar online behavior.

Keywords (10): Social media, Personal networks, Homophily, Weak ties, Information-sharing, Pervasive Awareness, Political news, Entertaining content.

How behavioral homophily on social media influences the perception of tie-strengthening within young adults' personal networks

The internet's effects on sociability have fueled a controversy: While some scholars criticize social media for promoting the “atomization of social life” and for amplifying the decline of social capital (Dotson, 2017), others consider such readings as overly reliant on a nostalgic understanding of community (Hampton and Wellman, 2018). Most scholars consider now that new media extend the offline relational contexts by helping to maintain and strengthen certain relationships, in particular strong ties at the core of offline interactions (Haythornthwaite, 2005). It has also been demonstrated that frequent social media users tend to have larger, and more dynamic, personal networks (Wang and Wellman, 2010) than those of less frequent users, because such active users are more likely to interact with a broad community of weak ties (Haythornthwaite, 2002; Ellison et al., 2007; Rainie and Wellman, 2012), and also to both lose old ties and gain new ones (Vriens and van Ingen, 2018).

Still, there is a lack of evidence about the way in which social media influences user perceptions concerning the strengthening of ties over time, especially with respect to weak or dormant ties. This article aims to analyze this phenomenon by focusing on the way homophily, as well as behavioral similarities among young adults on social media, can influence changes in users' perceived level of strength among their ties, and also the tendency for users to feel closer to certain relationships over time. The “homophily principle” in social networks (Lazarsfeld and Merton, 1954) – the tendency to associate with similar others – is one of the main explanatory factors regarding relational choices (McPherson et al., 2001). This principle is based on sociodemographic similarities (gender, race and so on) and similarities in terms of cultural or media consumption. As social media platforms promote the sharing of diverse information and media content (entertainment, news, etc.), they are likely to reveal their users' cultural tastes or political opinions. More generally, such content fuels a “pervasive awareness” among users,

while offering revealing glimpses as to the characteristics of social ties (Hampton, 2016). This sharing of information therefore tends to promote cultural affinities and to strengthen relationships between users with similar cultural tastes (Lewis et al., 2008; Lizardo, 2006), particularly among the most active users who often like, or comment on, each other's content (Burke and Kraut, 2014). The same is true for the sharing of political information, which can influence users' opinions of their friends and can reinforce – or weaken – certain relationships (Hampton et al., 2016). We will focus here on young adults, because these users' content-sharing behavior on social media is most likely to have an effect on the perceptions of their relationships, as they set up forms of “microcoordination” (Ling and Lai, 2016) within their personal networks, based on internet memes and a great diversity of content (image, video) and information (cultural, political, etc.).

This paper therefore aims to determine if users feel closer over time with friends who exhibit similar online behaviors and who share information-sharing practices. We survey a sample of young adults ($N = 133$), in order to analyze their extended personal networks, including a large set of both strong and weak ties (27.56 relationships on average, and 19.39 non-kin ties). Our findings highlight the way social media promotes a form of behavioral homophily, by leading respondents to feel closer to others who share the same types of online behavior (in terms of frequency of use and information-sharing practices), in particular with weak ties who do not belong to an ego's immediate social circle. In the first place, it appears that the perceived frequency of mutual reaction between users – in other words, how often users believe that they like, share or comment on each other's posts – has the greatest determining effect on the strengthening of their ties. Further, this trend is particularly pronounced among intensive users who often share political news and entertaining content (GIFs, memes, YouTube videos, etc.). Finally, we argue that such content constitutes affordances in the pervasive awareness among intensive social media users, which influence users' perceptions of tie-strengthening over time, particularly with respect to weak ties.

Social media and the perception of tie-strengthening

Social media and changes in social network composition

High rates of network churn are a concern for network analysts attempting to better understand which ties are lost and why (Fischer and Offer, 2019). Social media plays an important role in sociability by increasing the number of an ego's strong ties (those strongly integrated within his or her personal network), and by preventing tie dormancy over time (Marin and Hampton, 2019), particularly among weak ties. For Donath and Boyd (2004), social media may cause an accumulation of weak ties that users can maintain with others. Rather than isolating individuals, such media therefore enables users to maintain such ties cheaply and easily (Ellison et al., 2007), and encourages users to strengthen their interactions with a diverse and broad community of weak ties (Haythornthwaite, 2002; Rainie and Wellman, 2012). Nonetheless, even as scholars provide evidence that new media allows users to retain social ties while preventing tie dormancy, there remains a lack of evidence on this issue over the long term, and on the way social media influences user perception of tie-strengthening over time.

The role of social media in fortifying the emotional strength of “weak ties” (Granovetter, 1983) seems more pronounced among young people. Scholars have indeed emphasized the importance of foci activities as they change the emotional strength of social ties over time (Feld, 1981). The personal networks of young adults are unique in this way, because such individuals often belong to many groups (Cotterell, 2007) organized on the basis of their daily activities: school and university studies, cultural practices, sports and recreational activities, and so on. Scholars have shown that groups (Stadtfeld et al., 2020) and, more generally, social “circles” (Simmel, 1908; Grossetti, 2005) – including friends, colleagues and classmates – are of central importance to the socialization process, due to the role of strong ties in the transitivity process, facilitating as they do the introduction of friendly or romantic relationships. Consequentially, these social circles have an important function in young adults' networks, as they can bring

together not only best friends (strong ties) but also influential peers (who may represent weak ties with the potential to become stronger over time) (Cotterell, 2007). Such patterns lead us to expect a strengthening of ties among the social media users who belong to an ego's social circle.

Online behavior homophily in the tie-strengthening' perception

Homophily – the tie-generating mechanism which indicates the tendency for people to associate with others similar to themselves (Lazarsfeld and Merton, 1954) – plays an important role in the strengthening of social ties over time. Friends, romantic partners, and colleagues all tend to be more similar to each other than to randomly chosen members of the same population with respect to a variety of sociodemographic characteristics, including race, age, gender, socioeconomic status, and education (Marsden, 1987; McPherson et al., 2001; Favre et al., 2022). There are two mechanisms by which homophily arises (McPherson and Smith-Lovin, 1987; Blau, 1977): *Choice homophily* refers to ties between similar people resulting primarily from individual choices and psychological preferences, while *induced homophily* results from the homogeneity of structural opportunities for interaction, as in neighborhoods, schools, workplaces and circles of acquaintance.

Homophily therefore involves a selection process based on social similarities, but these similarities are not limited to sociodemographic characteristics. For example, cultural tastes also influence the relational choices made within personal networks (Lizardo, 2006). By facilitating increased information-sharing behavior based on cultural content (music, film, television), social media can, in terms of cultural consumption, have effects on homophily. In this way, social media can influence users' perceptions of their relationships by leading them to feel closer to others with similar cultural tastes. The same is true with all types of content shared on social media (personal photos and video, GIFs, memes, etc.), though the trend is more pronounced among young adults for whom entertaining content (Ling and Lai, 2016) and cultural practices play an important role in their sociabilities (Lewis *et al.*, 2008).

Following scholars who study political issues on social media, it seems relevant to distinguish here two other mechanisms by which such content-related homophily arises. Scholars have demonstrated that Facebook “friends” (Bakshy et al., 2015) and Twitter “followers” (Boutyline and Willer, 2017) often maintain like ideological positions, and – as they share information with each other – they are exposed to a greater amount of information aligned with their own ideological position than would be the case on a random basis. On the one hand, this trend might be explained as a form of *behavioral homophily*: it reflects the way social media can help strengthen ties between users who have similar online behaviors (for example, if they share or like political content at the same frequency on Twitter). But this shared affinity for political news can occur between two users in a relationship who hold opposite political views. *Attitudinal homophily* therefore refers to the awareness of users to share similar opinions (Hampton et al., 2016). As this similarity concerns the meaning of content, it is likely to have more influence on a user’s perception of tie strength. But it is still difficult to survey attitudinal homophily, because most of the time people are unaware of their disagreement (Goel et al., 2010). And while family members or close friends may have opposing views on some subjects, their relationships will not necessarily become weaker over time, despite these (sometimes morally and ethically incompatible) differences of opinion. This is why behavioral homophily on social media still provides strong evidence that a person’s perceived closeness to an acquaintance may increase simply because he or she shares the same type of content at the same frequency, in spite of their different points of view on certain subjects.

The notion of behavioral homophily is not only relevant to the study of political information-sharing; it also applies to the sharing of other types of information, for example that related to music consumption (Zhou et al., 2018), cultural information, and media content (film, television, video games, etc.). All these forms of content are likely to fuel a “pervasive awareness” among social media users, by revealing glimpses into the habits of other network members, according to their interests, opinions and activities (Hampton, 2016). Such content

then constitutes affordances in social media likely to influence how users perceive friends who have similar media preferences or cultural tastes. For example, users who often listen to music are likely to increase their online interactions with acquaintances who often share music-related content (behavioral homophily), in spite of being to some extent aware that they do not share exactly the same preferences in terms of musical genres and artists (attitudinal homophily). Over time, these information-sharing similarities are also likely to produce an “ambient intimacy”, which – as an emotional process – represents the feeling of closeness toward certain others on social media (Lin et al., 2016). There is a lack of evidence on the way this behavioral homophily on social media can influence the perception of tie strength, and how it helps to shape personal networks over time.

Studying changes in the perception of tie strength within personal networks

Our first hypothesis extends research showing that people grow closer to their most active friends on social media, by reading published content such as status updates and photos (Burke and Kraut, 2014). In France, scholars have highlighted more precisely the importance of age similarity with respect to information-sharing behavior among Facebook friends (Bastard et al., 2017). Their findings affirm that the intensity of social media use is of central importance in this regard, insofar as such frequency of use influences the size and diversity of a user’s core networks (Hampton et al., 2011; Vriens and van Ingen, 2018) and leads them to increase their interactions with, and get closer to, certain people – particularly non-kin ties (Hampton and Ling, 2013).

H1. The more a young adult (18 -30) interacts or exchanges content with another person via social media, the more likely he or she is to perceive a strengthening of their tie over time.

Frequent users of social media are more likely both to retain old ties and to reinforce new ones; the renewal of ties in their personal networks therefore occurs more frequently (Vriens and van Ingen, 2018). Social media also enables individuals to maintain a wide set of weak ties cheaply

and easily (Donath and Boyd 2004; Ellison et al., 2007). This leads us to expect that new media strengthens user interaction with a diverse and broad community of weak ties (Haythornthwaite, 2002; Rainie and Wellman, 2012).

H2. Young adults who frequently use social media perceive a strengthening of their relationships with weak ties over time, i.e. non-kin ties who are less integrated in the ego's personal network.

We can also expect this trend to be seen among the relationships of those who belong to the same social circles as ego. These circles have an important function in personal networks because they can help strengthen weak ties at any time (Grossetti, 2005). This trend is more frequent among younger people because they belong to a greater number of social circles (Cotterell, 2007). For example, Ling and Lai (2016) show how task-based chat groups increase interaction among members and tend to strengthen their relationships.

H3. Young adults perceive a strengthening of their relationships with their friends on social media who also belong to their social circles.

The sharing of information and content on social media creates a pervasive awareness among users, which is in turn likely to influence their relationships (Hampton, 2016). We can therefore expect that information-sharing similarities (politics, culture, entertainment, etc.) between egos and alters influence users' perceptions of tie-strengthening over time. In keeping with what some scholars have shown about how political information can motivate interactions among people with similar beliefs (Bakshy et al., 2015; Boutyline and Willer, 2017), we can also expect an over-representation of such news in terms of content-related behavioral homophily.

H4. Young adults perceive a strengthening of their relationships with those who exhibit similar information-sharing behaviors on social media. This homophily mainly concerns the sharing of political information.

Method

Survey procedure

We tested these hypotheses with a survey conducted on a sample of 133 young adults, aged 18 to 30. This population represents a sub-sample of a broader survey ($n = 726$) about the evolution of the personal networks in France from 2001 to 2017 (Favre et al., 2022). The social composition of this sub-sample is consistent with that of the population of young adults in France at large, due to the great diversity of profiles we selected among participants in several geographical zones within southwestern France. The questionnaire was administered in the presence of each respondent for a duration of approximately 4 hours. As this research protocol was very demanding, we decided to focus on a specific population in order to limit the scope of the survey procedure. As stated in the theoretical framework, we sampled young adults (less than 31 years of age) because such individuals frequently use social media to perform a wide range of information-sharing practices.

This questionnaire was created using multiple name generator techniques (McCallister and Fischer, 1978; Marin and Hampton, 2007), and designed to characterize a respondent's social environment. Participants were given a series of questions that elicited a list of network alters, such as those people with whom they talked about politics, or with whom they exchanged various services. Once a list of names was produced, participants were prompted to provide information about the demographic characteristics of each alter; about the relationships among alters; and about alters' uses of social media (perceived frequency of use, and of sharing different types of content). These data on egos and alters then allowed us to analyze respondents' personal networks in terms of composition and structure.

Our name-generating questions were based on Fischer's questionnaire (1982; cf. Table 1) which aimed to capture various kind of relationships (neighbors, family, colleagues, friends, etc.). We also used other name generators in order to identify individuals with whom respondents

discussed politics or shared advice regarding cultural consumption. Among all the names cited (39.8 names on average), we collected additional information on a subsample of 11 alters per respondent. The selection of the sub-sample was defined using a standardize procedure: the first new name cited in each generator. (If fewer than 11 names were selected, we started again with the first generator; the procedure was stopped once 11 names were chosen.)

We used four additional name generators in order to elicit information on a wider set of weak ties with whom ego interacted using social media and mobile phones (Table 1)¹. To wit, these included name generators pertaining to the ten individuals with whom ego most recently (1) had an interaction using Facebook (eg, like or comment); (2) had a discussion via messaging apps; (3) sent a text message, and; (4) shared a phone call.

Table 1. Number of names cited in response to name-generating questions

| Sources of names | | Average number of names | Standard deviation |
|---------------------------------------|--|-------------------------|--------------------|
| Name-generating questions | Taking care of the house when away* | 4.30 | 3.09 |
| | Going out* | 22.51 | 18.63 |
| | Leisure discussions* | 9.56 | 6.14 |
| | Discussions about personal matters* | 5.01 | 2.99 |
| | Advice for important decisions* | 3.56 | 2.87 |
| | Emergency financial help* | 3.33 | 2.60 |
| | Political discussions | 7.76 | 6.46 |
| | Advice for choosing books, music, films, games | 5.70 | 3.87 |
| | Intimate colleagues | 5.21 | 4.91 |
| | People from groups and activities | 6.08 | 3.60 |
| | Added names | 5.17 | 5.49 |
| Total subsample of names | | 10.85 | 0.90 |
| Additional names ICTs | 10 last people you had a <i>Facebook</i> interaction with | 9.47 | 1.29 |
| | 10 last people you had an interaction using <i>messaging apps</i> with | 9.53 | 1.38 |
| | 10 last people you had a phone call with | 9.47 | 1.01 |
| | 10 last people to whom you sent a text message | 9.67 | 0.75 |
| Total number of names selected | | 27.56 | 5.19 |

Note: * name-generating question from Fischer's questionnaire.

Therefore, this paper aims to analyze extended personal networks (on average 27.56 alters) based on 15 name generators and extensive data on both core and weak ties. We also reconstruct

¹ These additional name generators, based on ICTs, elicit a wide variety of ties. In particular, ties arising from Facebook and Messenger's activity log represent alters who are on average less emotionally close than those produced by other name generators (mainly, name generating questions and phone call logs).

the structure of each respondent's network by asking him or her to indicate whether two alters know each other well. One of our name generators draws from Facebook friends as a means of collecting the widest variety of profiles belonging to weak ties. But the other prompts, and our findings, include all other social media used by the respondent.

These questions led the 133 young adults of our sample to cite 3,522 relationships. We exclude kin ties from our analysis because they are less likely to be affected by social media. We then focus on the 2,579 non-kin ties in the sample, averaging at 19.39 non-kin ties per respondent. Table 2 shows the characteristics of the respondents and their relationships; alters often belong to the same age groups as egos (85.2% are under 30 years of age).

Table 2. Distribution of the sample of non-kin ties

| | | Ego | Alter |
|------------------------|---------|------------|--------------|
| Gender | Female | 48.1% | 49.3% |
| | <= 25 | 67.7% | 55.8% |
| Age | 26 - 30 | 32.3% | 29.4% |
| | 31 - 45 | | 12.4% |
| | 46 - 60 | | 2.1% |
| | 61+ | | 0.3% |
| Have children | | 6.8% | 10.9% |
| In a couple | | 21.1% | 30.8% |
| Higher educated | | 49.2% | 43.8% |
| N | | 133 | 2 579 |

Dependent variables

To analyze how social media affects the perception of tie strength over time, we first asked respondents if their online interactions had strengthened, weakened or had no effect on their relationships with each alter. As respondents seldom declared that social media had weakened their relationships (2.3% of the cases), we focus here only on the perception of tie strengthening. Second, we asked respondents to specify, on a scale of 1 to 5, to what extent they considered themselves close (or not) to the various alters cited. We use this response as a dependent variable to contrast the perception of relationship strengthening over time, due to social media, with the perception of relationship strength at the time of the survey. We binarize this variable

(if tie-strength is superior to 3) in order to indicate if ego feels especially close to alter, and to allow for comparison between our two dependent variables with the same statistical models. Our scale of analysis is therefore at the relationship level, not that of the individual. Because of the hierarchical nature of the data (19.39 non-kin ties on average for 133 respondents), we use multilevel binary logistic regressions models in order to include the variance intra each ego.

Independent variables

To test our hypotheses, we use five independent variables:

1. The *frequency of online interactions* (H1). Here we use an ordinal variable indicating how often ego and alter interact using social media.
2. The *normalized degree centrality of alters within the ego's personal network* (H2), which indicates the degree of integration of alters within the ego's personal network (H2); i.e. the share of other alters to which each alter is connected.
3. We also include *alters' affiliation to ego's social circles* by asking respondents to determine if each alter belonged, or did not belong, to one of his or her circles (e.g. "my band," "my friends from Paris").
- 4 and 5. The *similarity of online behavior* (H4). We asked respondents how often they shared six types of content on social media: political information; cultural information; music content; entertaining content (GIFs, Internet memes, etc.); photos and personal content; comments or reactions to friends' posts ("Like", "Share" and so on). We measure the frequency of such content-sharing with a scale from "never" to "several times a week". Respondents had also to report how often each alter shared these types of content. We thus analyze here how ego perceives the frequency of each alter's information-sharing practices using various social media (Facebook, Twitter, Instagram, Snapchat and so on). First, we determined the information-sharing similarities for each of these six types of content (4. *ICT use similarity*); we consider

that ego and alter exhibit similar behavior if they both share the same type of content at least once a week. Second, we determined a score of online behavior similarity by counting all the types of content shared by ego and each alter at least once a week (*5. Number of similar online behaviors*). Table 3 displays the rates of egos and alters who share each type of content at least once a week. Additionally, it reveals the rate of similarity between their information-sharing behavior, and we will determine, in the following sections, if this behavioral homophily helps to explain the perception of tie-strengthening over time.

Table 3. Percentage of egos and alters sharing each type of content at least once a week, and rate of similarity among relationships

| | Share of egos | Share of alters | Rate of similarity | |
|------------------------------|---------------|-----------------|--------------------|-----|
| | % | % | % | Sig |
| React to publications | 87.9% | 49.2% | 50.1% | ** |
| Entertaining content | 33.1% | 21.1% | 26.1% | *** |
| Musical content | 23.3% | 19.6% | 27.7% | *** |
| Cultural content | 22.9% | 16.8% | 21.3% | *** |
| Political content | 22.8% | 16.8% | 24.7% | *** |
| Personal content | 21.8% | 37.3% | 45.1% | *** |

Note: Chi² tests, *p<0.05, **p<0.01, ***p<0.001.

Table 4 shows the percentages of relationships between egos and alters with similar online behaviors, and which are considered as close or perceived as increasing in strength. We can see that homophily of online behaviors seems to explain the perception of strengthening relationships, but not necessarily that of relational closeness (except in regard to reactions to

posts, homophily of shared entertaining content and personal content). In the next sections, we control by several attributes in order to isolate the effects of online behavioral homophily.

Table 4. Distribution of the dependent variables

| | | Close relationships | | | Perception of tie-strengthening | | |
|------------------------------------|-----------------------|---------------------|-------|-----|---------------------------------|-------|-----|
| | | <i>N</i> | % | Sig | <i>N</i> | % | Sig |
| Similar behavior | React to publications | 1135 | 47.0% | *** | 1135 | 37.1% | *** |
| | Musical content | 166 | 41.6% | | 167 | 46.1% | *** |
| | Political content | 145 | 47.2% | | 145 | 56.6% | *** |
| | Entertaining content | 223 | 55.2% | *** | 223 | 42.6% | *** |
| | Cultural | 126 | 40.5% | | 126 | 45.2% | *** |
| | Personal content | 253 | 48.2% | * | 254 | 47.6% | *** |
| Number of similar behaviors | 0 | 1316 | 39.0% | | 1324 | 15.2% | |
| | 1 | 786 | 46.4% | | 786 | 34.7% | |
| | 2 | 268 | 49.3% | ** | 269 | 35.3% | *** |
| | 3 | 113 | 48.7% | | 113 | 48.7% | |
| | 4 to 6 | 87 | 44.8% | | 87 | 57.5% | |
| Total | | 2570 | 43.0% | | 2579 | 26.1% | |

Note: Chi² tests, *p<0.05, **p<0.01, ***p<0.001.

Control variables

We control our findings using several attributes of both egos and alters. For the respondents, we control by age (using a continuous variable), coupledness status, child-rearing status, education (with or without advanced degree), gender, the level of urbanization of ego's residence (the level of urbanization is an explanatory factor for homophily (Fischer, 1982); we control it with an ordinal indicator), as well as the respondent's frequency of ICT use.

For each relationship, we also control by the alter's role (friend, colleague, neighbor, acquaintance, or romantic partner) and the various types of similarities between ego and alter, in order to identify how online behaviors can be explained by socio-demographic

characteristics. Age similarity is measured here by the negative absolute age difference between ego and alter. The similarity of education is measured with a binary variable indicating whether ego and alter have the same education level (with or without advanced degree). The coupledness status and child-rearing status similarities are both measured using binary variables: living as part of a couple or living alone, living with or without children.

Results

Perceived closeness of relationships in personal networks

Models 1 and 2 (Table 5) analyze how close egos feel, at the time of the survey, to the various individuals with whom they have relationships, in particular those with whom they often interact using social media. The objective is to assess whether online behavior similarities can influence the emotional perception of the relationships in question.

First, these models highlight the importance of relationship type: respondents feel closer to their romantic partners than to their friends, and they feel closer to their friends than to their colleagues, neighbors or acquaintances. More importantly, it appears that respondents' sociodemographic attributes are insignificant in explaining relational closeness; social ties are not necessarily stronger when ego and alter have the same gender, age, education level or family status.

Second, it appears that the degree centrality of each alter within an ego's personal network strongly determines the strength of the ties between them: strong ties are on average more connected to other alters in an ego's network, and often belong to an ego's social circle. Tie strength is also significantly explained by the frequency of online interactions, as respondents more often use ICT to interact with people to whom they feel close than with others. It also appears that online behavior homophily does not determine relational closeness: respondents do not necessarily feel closer to alters who share the same types of content at the same frequency

(Model 1), nor those with whom they have the highest score of similar online behaviors (Model 2).

In conclusion, respondents feel closest to people more integrated in their personal networks (i.e. the alters who know the largest number of other alters reported by ego), who are part of their social circles, and with whom they have frequent online interaction – regardless of the type of shared content. These findings, regarding the perceived closeness of relationships, now allow us to determine whether online behaviors change the perception of tie strength over time.

Social media and changes in the perception of tie strength within personal networks

Model 3 (Table 5) shows whether respondents perceive that social media has strengthened specific types of relationships over time. First, it appears that all the respondent characteristics are insignificant in this regard; respondents perceive a strengthening of all their relationships in the same proportion, regardless of their sociodemographic attributes. Respondents also report feeling closer to others among all their relationship types (spouses, friends, neighbors and acquaintances), but less so with colleagues. The degree centrality of an alter within an ego's personal network also has an important effect, but in an opposite manner than seen in Models 1 and 2: Respondents often perceive that social media has strengthened their relationships over time with ties who have a low degree centrality, i.e. the weak ties who know the fewest other alters reported by ego. Here it also appears insignificant whether or not these alters belong to an ego's social circle.

Model 3 also includes online behaviors. First, as observed with Models 1 and 2, the frequency of online interaction among users directly correlates to the perceived strengthening of their relationships. However, online behavioral similarities have now a positive effect: respondents feel closer over time to the most active users that react to, comment on, or “like” postings at least once a week. Similarities with respect to content-type also cause a slight behavioral homophily, which changes the perception of tie-strength over time: it occurs more often when ego and alter both share political or entertaining content (internet memes, GIFs, humorous

videos, etc.) at least once a week. This effect is more significant when we include all types of shared content in order to determine the online-behavior similarity score between egos and alters (Model 4). It therefore appears that the more ego and alter behave similarly, the more ego perceives a strengthening of their relationship over time.

In conclusion, these findings show that social media leads users to perceive a strengthening of the ties between themselves and others with whom they often interact, especially weak ties, who are less integrated in their personal networks and who do not belong their social circles, and who often share political and entertaining content.

Table 5. Models explaining perceived closeness of relationships and perceived changes in tie strength using social media

| | | Perceived closeness of relationships | | | | Perception of tie-strengthening | | | | | | | |
|--|-----------------------|--------------------------------------|---------|---------|---------|---------------------------------|---------|---------|---------|-------|--------|-------|-----|
| | | Model 1 | | Model 2 | | Model 3 | | Model 4 | | | | | |
| | | Coef | Std err | Coef | Std err | Coef | Std err | Coef | Std err | | | | |
| Ego's attributes | | | | | | | | | | | | | |
| Gender (Male) (ref. female) | | 0,078 | 0,252 | 0,122 | 0,249 | -0,455 | 0,269 | -0,392 | 0,262 | | | | |
| Age (26-30) (ref.18-25) | | 0,056 | 0,05 | 0,054 | 0,05 | -0,054 | 0,054 | -0,055 | 0,053 | | | | |
| Live with children | | -0,623 | 0,647 | -0,611 | 0,642 | -0,813 | 0,666 | -0,716 | 0,649 | | | | |
| Live as a couple | | 0,103 | 0,347 | 0,131 | 0,342 | 0,41 | 0,363 | 0,482 | 0,354 | | | | |
| Higher educated | | -0,368 | 0,273 | -0,375 | 0,271 | 0,359 | 0,292 | 0,37 | 0,286 | | | | |
| Zone (ref. Rural zone) | City center | 0,164 | 0,402 | 0,184 | 0,399 | 0,482 | 0,433 | 0,536 | 0,423 | | | | |
| | Suburb | 0,881 | 0,496 | 0,923 | 0,492 | 0,423 | 0,531 | 0,459 | 0,52 | | | | |
| | Medium city | 0,103 | 0,452 | 0,084 | 0,448 | 0,036 | 0,49 | 0,043 | 0,48 | | | | |
| ICT use (ref. do not use Social medias) | Consult and publish | -1,49 | 1,097 | -1,516 | 1,083 | -0,889 | 1,085 | -0,702 | 1,065 | | | | |
| | Consult content | -1,368 | 1,102 | -1,368 | 1,088 | -1,035 | 1,09 | -0,879 | 1,07 | | | | |
| Relationship attributes | | | | | | | | | | | | | |
| Relationship (ref. friend) | Romantic partner | 0,326 | 0,331 | 0,326 | 0,33 | 0,025 | 0,263 | 0 | 0,262 | | | | |
| | Neighbor/acquaintance | -2,36 | 0,515 | *** | -2,418 | 0,514 | *** | 0,088 | 0,282 | 0,091 | 0,282 | | |
| | Colleague | -1,584 | 0,157 | *** | -1,579 | 0,156 | *** | -0,421 | 0,15 | ** | -0,42 | 0,15 | ** |
| Gender similarity | | 0,233 | 0,129 | 0,249 | 0,128 | -0,166 | 0,128 | -0,181 | 0,128 | | | | |
| Age similarity | | -0,026 | 0,014 | -0,026 | 0,014 | -0,014 | 0,015 | -0,011 | 0,015 | | | | |
| Education similarity | | 0,053 | 0,137 | 0,052 | 0,136 | 0,141 | 0,136 | 0,131 | 0,136 | | | | |
| Child-rearing status similarity | | -0,045 | 0,229 | -0,036 | 0,228 | -0,252 | 0,23 | -0,229 | 0,229 | | | | |
| Coupledom similarity | | 0,219 | 0,145 | 0,225 | 0,145 | -0,381 | 0,149 | * | -0,382 | 0,148 | * | | |
| Alter's position in Ego's network | | | | | | | | | | | | | |
| Degree centrality of alter | | 3,786 | 0,468 | *** | 3,772 | 0,467 | *** | -2,45 | 0,448 | *** | -2,432 | 0,446 | *** |
| Alter is part of a social cercle | | 1,172 | 0,157 | *** | 1,172 | 0,156 | *** | -0,094 | 0,149 | | -0,087 | 0,149 | |
| Online interactions | | | | | | | | | | | | | |
| Frequency of online interaction | | 1,105 | 0,07 | *** | 1,1 | 0,069 | *** | 0,572 | 0,065 | *** | 0,568 | 0,065 | *** |
| ICT use similarity | Mutual reaction | 0,069 | 0,136 | | | | | 0,905 | 0,137 | *** | | | |
| | Politics | 0,253 | 0,293 | | | | | 0,685 | 0,285 | * | | | |
| | Entertaining content | 0,396 | 0,247 | | | | | 0,454 | 0,228 | * | | | |

| | | | | | | | | | | | | | |
|---|-----------------------|-----------|-------|-----|--------|-----------|-----|--------|-------|-----------|--------|-------|-----|
| | Personal content | -0,431 | 0,269 | | | | | 0,149 | 0,251 | | | | |
| | Culture | -0,454 | 0,322 | | | | | 0,075 | 0,284 | | | | |
| | Music | -0,072 | 0,291 | | | | | -0,131 | 0,272 | | | | |
| Number of similar online behaviors (ref. No similar behavior) | 4-6 similar behaviors | | | | 0,16 | 0,366 | | | | | 1,566 | 0,333 | *** |
| | 3 similar behaviors | | | | -0,135 | 0,315 | | | | | 1,413 | 0,284 | *** |
| | 2 similar behaviors | | | | 0,011 | 0,213 | | | | | 1,013 | 0,208 | *** |
| | 1 similar behavior | | | | 0,011 | 0,142 | | | | | 1,033 | 0,143 | *** |
| Intercept (fix) | | -4,949 | 1,653 | ** | -4,9 | 1,637 | ** | -0,732 | 1,72 | | -1,036 | 1,687 | |
| Intercept (random) | | 1,238 | 0,241 | *** | 1,219 | 0,237 | *** | 1,434 | 0,271 | *** | 1,36 | 0,259 | *** |
| <i>N</i> | | 2213 | | | | 2213 | | | | 2218 | | | |
| AIC | | 11186,084 | | | | 11179,502 | | | | 10982,454 | | | |
| | | | | | | | | | | 10964,664 | | | |

Note: Multilevel binary logistic models. Dependent variable: Respondent feels close to alter (Model 1 and 2) and perceived strengthening of relationships using social media (Model 3 and 4). *p<0.05; **p<0.01; ***p<0.

Discussion

We studied the way online behavioral homophily - behavior and information-sharing similarities exhibited on social media - can influence users' perception of tie-strengthening over time, with certain relationships. Our findings lead us to draw four main conclusions (cf. Table 6):

Table 6. Hypotheses on behavioral homophily and social media

| | Hypothesis | Perception of tie-strengthening |
|-----------|--|--|
| H1 | The more a young adult interacts or exchanges content with a friend via social media, the more he or she perceives a strengthening of their relationship over time. | Supported |
| H2 | Young adults perceive a strengthening of their relationships with weak ties, who are less integrated in their own personal network. | Supported |
| H3 | Young adults perceive a strengthening of their relationships with those who belong to their own social circles. | Not supported |
| H4 | Young adults perceive a strengthening of their relationships with those who have similar information-sharing behaviors. This homophily mainly concerns the sharing of political information. | Supported Mainly for political and entertaining content |

First, our method allows us to process a large number of sociodemographic attributes according to ego and alters. In the end, each of the respondent characteristics appears insignificant, and none explains how social media influences the young adults' perception of tie-strengthening among others. This finding is not consistent with previous studies, which have emphasized the central importance of age similarity with respect to information-sharing behavior among Facebook friends (Bastard et al., 2017). As the inconsistency may result from our focus on young adults, it deserves to be analyzed by continued research, including all age groups.

Second, young adults tend to feel closer to people that belong to their own social circles (H3, cf. Model 2: "Alter is part of a social circle"). This finding is consistent with previous research. Scholars have shown that groups and "social circles" (Simmel, 1908; Grossetti, 2005) constitute an important relational context for activities such as meeting friends, due to the role of strong

ties in the transitivity process. Therefore, social circles have an important function in young adults' networks, because they can bring together best friends with influential peers (weak ties likely to become stronger over time) (Cotterell, 2007). This pattern leads us to expect a strengthening of ties between social media users who belong to an ego's social circle. However, the hypothesis is not supported (H3, cf. Model 4: "Alter is part of a social circle"), which leads us to consider that affiliation with a group (Stadtfeld et al., 2020) or online social circle, such as task-based chat groups (Ling and Lai, 2016) created by close friends, do not often lead users to feel closer with each other over time. Following Haythornthwaite's (2005) work on media multiplexity, this finding rather suggests that instant messaging and social media have little influence on the emotional perception of strong ties with whom users interact in various online and offline contexts. But, as new media influences user perception of tie-strengthening among weak ties (H2, cf. Model 4: "Degree centrality of alter"), this finding therefore emphasizes in another way that new media also tends to promote interactions with a broad community of weak ties (Haythornthwaite, 2002; Donath and Boyd, 2004; Ellison et al., 2007). We also highlighted here how the perception of tie-strengthening with weak ties can be explained with reference to the perception of similarity regarding online behavior.

Third, we show that behavioral homophily on social media does not only involve similarities based on sociodemographic characteristics. We underline that young adults feel closer to, and perceive a strengthening of ties with, those with whom they have the most online interactions (H1, cf. Models 2 and 4: "Frequency of online interaction"). This finding extends studies on the effects of intensity of use on tie renewal (Vriens and van Ingen, 2018) by highlighting how such frequency can positively influence relational closeness and the perception of tie-strengthening over time. This leads us to emphasize that frequent social media users actually grow closer to their friends through social media (Burke and Kraut, 2014), and to weak ties in particular. Scholars also show that initiating more interactions with another user was positively

associated with emotional closeness, whereas receiving interaction from alters was not a determining factor (Lin et al., 2016). Our findings therefore warrant further exploration, in order to determine if users feel closer to weak ties who initiate online interactions more or less often.

Fourth, we determine that this trend is particularly significant among friends with whom young adults have the highest online-behavior similarity scores (H4, cf. Model 4: “Number of similar online behaviors”). By focusing on 6 types of information-sharing behavior, our findings highlight the importance of the perceived frequency with which ego and alters “like,” “share” or “comment” in response to one another’s posted content. These mutual reactions, in the context of social media’s “pervasive awareness” (Hampton, 2016), constitute important clues about the strength of friendships. The “like” and “share” buttons on social media apps are designed to be easy to use in public settings, and this design tends to increase interactions among users (Figeac and Chaulet, 2018). Therefore, it logically appears here that young adults consider themselves closer over time with ties who themselves frequently use these buttons in order to provide clues about mutual interests, thus reaffirming the strength of their friendship.

We also demonstrate how political content influences the perception of tie strength by leading respondents to feel closer over time to alters who share such content at the same frequency (H4, cf. Model 4: “ICT use similarity”). These results are all the more notable because, in France as elsewhere, it is generally assumed that political subjects are less central to the concerns of young adults, for various reasons (lack of political representation, lack of trust in institutions such as journalism or government, etc.). However, our findings show that young adults who often share political content perceive that social media has brought them closer to others who also often share political content. This being the case, such behavioral homophily seems to differ from attitudinal homophily. According to Hampton, Shin and Lu (2017), social media has a negative relationship to deliberation in many offline settings because the uses of these platforms are often

associated with having a lower perceived level of agreement among social ties. These researchers' work demonstrates the way that attitudinal homophily reduces the willingness of social media users to join political conversations in some offline settings. Such findings do not contradict the trend highlighted here, concerning the tendency of young adults to feel closer to others who often share political information. Rather, they lead us to consider that social media reinforces this contrary (but non-contradictory) pattern relating to political issues – a pattern of nonparticipation in, and disengagement from, offline political conversations – while still helping over time to shape personal networks between those who share this same, content-related affinity. This phenomenon deserves to be further investigated, with due consideration paid to a critical element not addressed here: the influence of recommendation algorithms in shaping the information-sharing behavior of social media users (Bakshy et al., 2015; Papakyriakopoulos et al., 2020), particularly regarding attitudinal homophily and content-related affinities.

Our findings also illustrate how entertaining content positively influences young adults' perception of tie-strengthening over time (H4, cf. Model 4: "ICT use similarity"). This leads us to argue that the positive and entertaining nature of these messages constitutes an affordance, attracting users' attention during their daily social media engagement. They differ from content that is likely to reveal differences of opinion (Hampton et al., 2017). Entertaining content mitigates such differences, serving both to build cultural affinities between friends and to increase feelings of emotional closeness among those who merely follow each other on social media (Lin et al., 2016). What's more, entertaining content reveals, more than others, how pervasive awareness among users sometimes goes no further than the desire to be distracted by messages that activate some friendships, rather than to be exposed to content likely to reveal cultural or political differences with friends.

Limitation

This research is based on a sample of 133 young adults aged 18 to 30. This methodological approach limits the scope of our findings. Since “young adults” represents a specific population, our results should be confirmed by additional observations involving other age groups.

We used here a questionnaire and self-reports in order to analyze the perception of tie-strengthening over time. The retrospective and temporal nature of our findings presents some limitations, arising from the fact that our methodology is based on user perception. These limitations are more specifically related to (1) user perceptions of tie-strengthening with certain alters over time, despite the fact that their relations may have been discontinuous and dynamic over time, and their uses of social media more or less consistent; (2) user perceptions of all the social media platforms (Facebook, Twitter, Instagram, Snapchat, etc.) that have affected their tie strength with each alter over time; (3) user perceptions of the frequency with which each alter uses all these social media platforms over time, and; (4) user perceptions of the frequency with which each alter uses all these social media platforms over time to share the different types of content.

The duration of the questionnaire (4h) also presents a limitation for this research, as it might have strained respondent motivation (Marin and Hampton, 2007). Questionnaires were administered over two appointments of two hours each, scheduled a few days apart. This duration could have affected the quality of the data, for example by leading respondents to cite fewer and fewer names in response to the name generator, or to provide less information on alter profiles as time went on.

Conclusion

Despite these limitations, this article – particularly by focusing on weak ties and members of users’ social circles – provides evidence on the way social media influences user perception of

tie strength and helps to shape personal networks over time. Our findings suggest as well that new media does not promote social isolation; rather, it leads intensive users to feel closer to weak ties whose content they often like, share or comment on. Such media tends to promote an homophily-by-choice based on information-sharing similarities, especially those involving political news and entertaining content. These findings emphasize the growing, long-term importance of the relational affinities based on these contents, and of the mutual reactions between friends, which provide clues about common interests and help to shape personal networks over time, while also discreetly weakening ties with those who do not share the same content-related affinities and who do not use social media in the same way. Scholars have shown that social media algorithms help to shape the information-sharing behavior of social media users (Bakshy et al., 2015; Papakyriakopoulos et al., 2020), and it would be of further scientific interest to determine how such algorithms are likely to influence the perception of tie-strengthening and to help to shape personal networks over time.

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