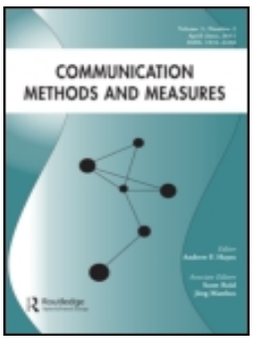

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Co-Orientation of Media Use: Studying Selection and Influence Processes in Social Networks to Link Micro Behavior of TV and YouTube Use to Meso-Level Structures

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ABSTRACT

Social interactions regarding media content are omnipresent and highlight that media use is closely linked to social life. However, surprisingly little is known about the related social dynamics and their consequences for media use and social relations. This study addresses this topic based on co-orientation theory and investigates the social dynamics of TV and YouTube use among adolescents. A three-wave panel survey among 336 pupils enables us to disentangle which effect the friendship network has on individual media use (RQ1) and which effect media use has on the development and maintenance of friendship ties (RQ2). Based on a multi-level approach of dynamic social network analysis and applying stochastic actor-oriented modeling, we find empirical evidence for processes of social influence regarding TV programs and YouTube channels. No support is found for the hypothesized social selection processes. Along with these empirical insights, the research design demonstrates how the micro-level of individual behavior can be linked with the meso-level of social groups. Furthermore, the insights can be used as a basis to understand larger-scale phenomena emerging on the macro-level of societies and media markets such as audience fragmentation and long-tail audience distributions across media contents.

Social Dynamics of Adolescents' Media Use

People discuss which TV programs are worth watching, meet to watch a specific program, share links to online articles and videos, or discuss their previous day's media menu. These and other media-related social interactions are part of our daily lives, and digitalization has multiplied the possibilities for how and with whom we can engage with respect to media use. However, surprisingly little is known about these social dynamics and their consequences for media use and social relations. We argue that these dynamics do not happen at random but follow specific tendencies. For example, people may start using the same media content as their friends or may prefer to engage with people who use the same media content. In doing so, media use is a co-orientation process by the means that a person's media use, the relation to other persons, and the media use of these persons are interrelated (Newcomb, 1953). Furthermore, this paper argues that this co-orientation process provides an explanation for the emergence of distinct patterns of media use within social networks. For example, as a result, pupils in a school class may all watch the same TV program, or boys might agree on a specific YouTube channel while girls prefer another channel. In fact, these patterns of network auto-correlation among adolescents are in line with what most will remember from their own adolescence.

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This paper focuses on adolescents and their media use in order to investigate the social dynamics of media use. More specifically, our aim is to understand and disentangle which effect the social context has on individual media use (RQ1) and which effect media use has on the development and maintenance of social relations (RQ2). Peer groups of adolescents are of special interest since they can be regarded as prototypical examples of social networks with a high intensity of social interactions, resulting in a dense friendship network. Furthermore, social networks among adolescents are found to be highly dynamic. In a single school year, half of all friendships change, and the fraction of stable friendship relations shrinks for longer time intervals to single digits (Felmlee et al., 2018). This contrasts with younger children, who are strongly embedded in their family, and adults whose social networks tend to decrease over time, both in size and relative importance (English & Carstensen, 2014; Wrzus et al., 2013). Regarding media use, adolescents' behavior is also in constant flux. Obviously, this is an important prerequisite to study dynamic processes. In our study we will focus on serial TV programs and YouTube channels since they were found to be the two most important media types in the respective age group (Feierabend et al., 2015; Friemel & Bixler, 2018). This empirical setting and the theoretical arguments of co-orientation provide the opportunity to investigate the selection and influence processes in social networks and to discuss their importance to link the micro behavior of individuals to meso-level structures within social groups. Furthermore, the insights can be used as a basis to understand larger-scale phenomena emerging on the macro-level of societies and media markets, such as audience fragmentation and long-tail audience distributions across media contents (Webster & Ksiazek, 2012).

Co-Orientation

The co-orientation model proposes theoretical arguments for how people behave in relation to other persons and objects of reference (e.g., media content). Newcomb's co-orientation model dates back to 1953 and has its origin in the study of communicative acts. It includes two persons (A and B) and an object (X). The two persons and the object form a triad (Figure 1a) in which the two persons have a relation of positive or negative *attraction* toward the respective other (A→B, B→A) and both have an *attitude* regarding the object (A→X, B→X). The notion of co-orientation expresses that there is a "simultaneous orientation" of A regarding B and X and vice versa. Hence, the relations are all interdependent and, based on *balance theory*, it is assumed that "there are 'strains' toward preferred states of equilibrium" (Newcomb, 1953, p. 395). A state of equilibrium or balanced constellation is given when, for example, two friends talk about a TV program they have both seen and agree about liking or disliking it (Cartwright & Harary, 1956; Heider, 1946).

Despite its origin in communicative acts, the co-orientation model has been only little applied to study media use. Clarke (1971) applied the model to study information-seeking among adolescents. He found that the perceived interest of relevant others has an influence on information-seeking behavior regarding music. Hence, the study did not investigate the influence of B→X on A but rather the influence of the perception of B→X. Chaffee called this adaptation of the co-orientation model an interpersonal perception model (Chaffee, 1973), and Pearce and Stamm applied it to study reading interests among students (Pearce & Stamm, 1973). The distinction between the evaluation of a person and the perception of their evaluation by other persons adds an additional level of complexity to the model that limits empirical investigation. Because of this, studies focus either on the perceived evaluation of media contents (Clarke, 1971) or the effective evaluation of media contents, as we will apply it in our study.

Despite these differences, there are two aspects that all studies have in common and should be stressed as important foundations for our work. First, the co-orientation model suggests an *actor-oriented approach* by the means that a person decides on his/her attitude toward an object (X) and his/her attraction toward other persons. Other actors and their attitudes toward an object may influence attitude and attraction, but neither can be determined or forced by another actor. Ultimately, the person always decides on attitude and attraction and is therefore regarded as an

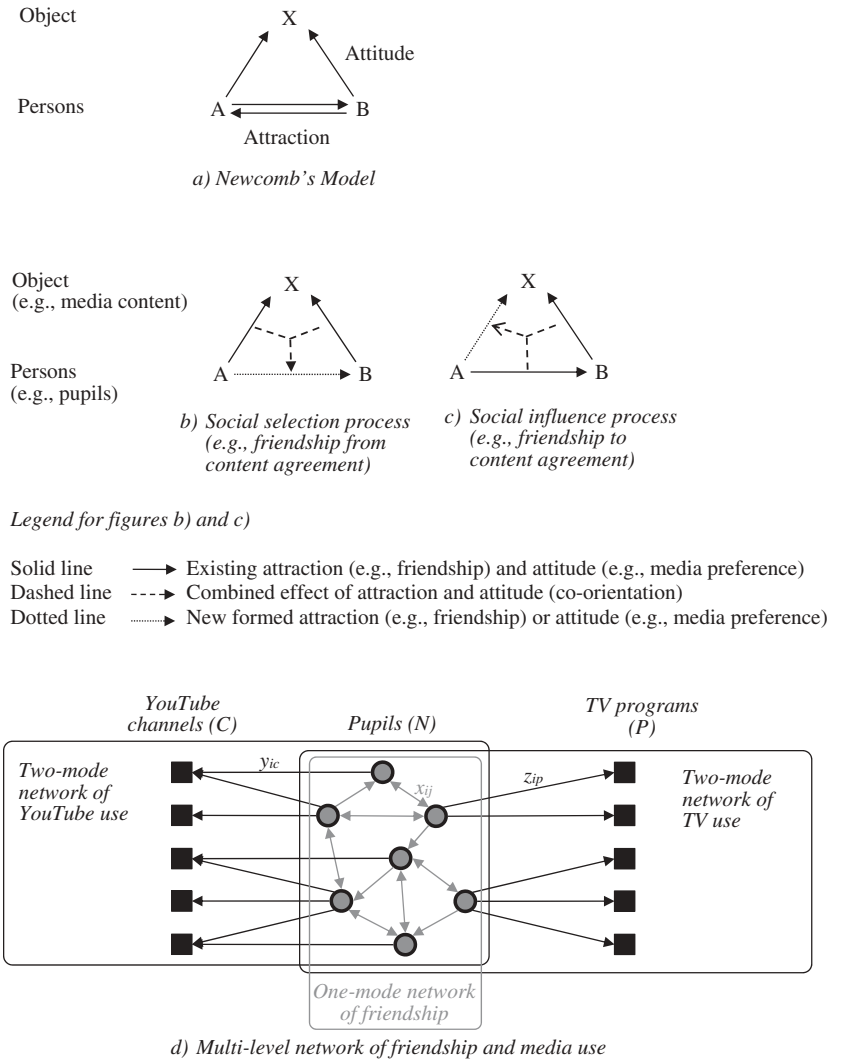


Figure 1. Models of co-orientation between people and media content.

actor. Second, attitude and attraction are interdependent. Attraction is dependent on the attitude of the involved persons regarding an object (selection; Figure 1b), and attitude is dependent on other persons and their attitudes (influence; Figure 1c). It is important to note that Newcomb formulated his model as a model for "social behavior" (p. 393) and that attitudes can be expressed and perceived by behavior. Whether the attitude toward an object X is aligned with the behavior is dependent on the behavioral freedom of the actors. With respect to media use, the "calculability of the other's behavior" (p. 395) is fulfilled as long as the media are equally accessible within the context of all relevant actors. This condition is met for the media investigated in this article (i.e., most popular series on free TV and freely available YouTube channels). Time is likely to be the only restriction with respect to these types of media use. Hence, the use of a specific content expresses its prioritization over other contents, which is, in turn, an expression of attitude.

The next two subsections focus on the relevant theoretical arguments and the empirical findings for social selection and social influence processes in more detail. Two additional sections will address the dynamics of media use and structural dynamics within friendship networks. This is necessary

because the co-orientation proposed by Newcomb (Figure 1a) is but one of several social processes that are well-known to drive both overall media use patterns and the evolution of friendship networks. Finally, the interdependence of the two elements of co-orientation processes (i.e., selection and influence), as well as their embeddedness in a larger context (i.e., dynamics of media use and network dynamics of friendship structures), are addressed in a final subsection (Figure 1d). It should be noted that our research questions address the first two dynamics (i.e., selection and influence). At the same time our empirical design and analytical approach allows us to take the other two dynamics (i.e., dynamics of media use and network dynamics of friendship structures) into account and control for them.

Social Selection: The Relevance of Media Use for the Formation and Maintenance of Social Relationships

The dynamic of social selection builds on the idea that "birds of a feather flock together." Figure 1b illustrates this concept graphically. The process distinguishes between two stages. In the first stage, the two persons A and B both have the same attitude toward an object X (solid lines). Dependent on the similarity of attitudes, person A feels attracted to B and forms, dependent on that (dashed line), a social relation to person B (dotted line) in the second stage. As a consequence of selecting similar others when forming new social ties (e.g., conversation, friendship), *homophilic* social structures emerge over time (Lazarsfeld & Merton, 1954). This dynamic is prominent and well-documented in sociological research and has mostly been studied regarding sociodemographic dimensions and behavior patterns such as achievement, delinquency, and substance abuse (Mark, 1998; McPherson et al., 2001). However, theoretical models and empirical findings also support the importance of homophily for cultural goods. For example, music can be understood as a badge (Frith, 1981) for a set of values (Boer et al., 2011) in order to signal information about one's personality (Rentfrow & Gosling, 2006) and the belonging to a specific peer group (Franken et al., 2017). As predicted by the theoretical reasoning of co-orientation, preferences for similar music tastes have been found to influence the social selection processes (Knobloch et al., 2000; Lomi & Stadtfeld, 2014; Steglich et al., 2006). Since music tastes are found to be related to both values and traits, the question arises of which attributes are conveyed by music preferences. Concerning this, Boer et al. (2011) argued and empirically validated that it is more likely to be about value similarity than trait similarity. At the same time, the direct effect of similarity of music preferences remained significant even after controlling for the mediating effect of value similarity. Homophilic social selection was also found for television, indicating that adolescents with a preference for similar TV series are more likely to talk to each other and to become friends (Friemel, 2012). Similar dynamics are documented for online networks. On many user profiles of online networking sites, preferences for media content (e.g., music, TV series, actors) are displayed (Good, 2013; Liu, 2008), and the visibility of these preferences is likely to play a role in identity information, which ultimately guides friendship formation (Ellison et al., 2011; Johnson & Van der Heide, 2015; Lewis et al., 2012). With respect to computer games, there are supporting findings for the mere use of computer games as a hobby (Eklund & Roman, 2017). While most empirical studies support the existence of media-related social selection processes, it should be acknowledged that there are also examples of online networks in which socio-demographics and preferences for different types of computer games had no effect on selection processes (Lee, 2015).

Social Influence: The Relevance of Social Structures for Media Use

The idea of social influence is that the social structure precedes the attitude toward an object. Hence, from this perspective the social structure is not the result that is dependent on media preferences, as is the case for the social selection processes discussed above. Figure 1c illustrates this two-staged process. If, in the first stage, A is positively attracted toward B and B has a positive attitude toward

X (solid lines), this will lead (dashed line) to a positive attitude of A toward X (dotted line) in the second stage.

In the 1940s, the seminal studies by Lazarsfeld et al. (1944) on political communication, as well as early diffusion studies (Ryan & Gross, 1943), pointed to the crucial role of interpersonal communication in the dissemination of information and innovations. While the former is regarded as the starting point of opinion leadership research (Weimann, 1994), the latter is often referred to in the literature on the diffusion of innovations (Rogers, 2003; Valente, 1995). An important assumption of the co-orientation model is that influence is positively related to the attraction toward the other person. Thus, while a positive attraction will support influence to occur, a negative attraction should have either no influence or even a negative influence. Regarding media use, empirical evidence for influence processes is found for music and screen time (TV, video, gaming) (Lomi & Stadtfeld, 2014; Shoham et al., 2012; Steglich et al., 2006), indicating that adolescents adapt their media use to their personal networks. It is important to note that the influence process should not be regarded as forcing a person to change his/her media use. Following uses and gratifications research, influence should rather be thought of as being motivated by anticipated follow-up communication and therefore supports the adaptation of media use to others (Raeymaeckers, 2002).

Structural Dynamics of Media Use

As noted in the introduction, individual media use is typically not limited to a single content. Following the structural idea of the co-orientation model, we can consider media use by a person as a network that links the person to the various media contents. Webster and Wakshlag (1983) proposed a model of television program choice that includes, among others, "program type preferences" and the "structure of available program options" as influencing factors for program choice. In fact, personality traits like extraversion, neuroticism, and psychoticism are found to be correlated with the selection of music, film, and television program genre (Hall, 2005; Shim & Paul, 2007). The second factor, "structure of available program options," refers to aspects that are independent from the user. With respect to TV, this includes the time of airing and the context of other programs aired before, during, and after. For example, when two programs are paired on the television schedule, with one airing just after the other, the likelihood is greater that the same audience sees the two. If two programs are aired in parallel or totally disjointed, this likelihood will be lower. For YouTube, different content structures are important. Since YouTube is not a linear medium, there is no restriction to use any combination of content. At the same time, the links between the videos and channels as well as the algorithmic selection will make certain combinations more likely than others. In sum, both content-related characteristics (i.e., the program-type preferences and the structure of available program options) may result in inter-individual structures of media use that should be taken into account.

Structural Dynamics of Friendship Networks

Friendship ties are found to be strongly correlated with time spent together as well as frequency of conversation, and both dimensions are of relevance for the social dynamics of media use. While only a handful of empirical studies have specifically investigated network dynamics and media use (Friemel, 2012; Lewis et al., 2012; Lomi & Stadtfeld, 2014; Shoham et al., 2012; Steglich et al., 2006), there are comprehensive findings for the dynamics of friendship ties among adolescents. Reciprocity and clustering are the two most frequently found mechanisms that drive the creation and maintenance of friendship ties (Block, 2015). Reciprocity means that friendship nominations are typically reciprocated (i.e., if a person *i* is nominating person *j*, there is also likely to be a reverse nomination from *j* to *i*). The dynamics of clustering extend the scope from dyadic relationships to triads or larger sets of actors. Consequently, various processes of triadic closure are found to be of interest, which means that a tie between two persons is dependent on their relations to a third person or object, as proposed by

cognitive balance theory (Heider, 1946). While only a few studies focus on these dynamics (Block, 2015), the majority include them as controls while focusing on other network dynamics.

Summary of the Current State of the Art

The idea that individual media use should be regarded as being embedded in a social context can be found in various lines of research. It dates back to the middle of the last century (Riley & Riley, 1951) and was continued in the tradition of uses and gratifications research (Blumler & Katz, 1974) and the theory of social action (McQuail & Renckstorf, 2010). In our literature review, we have focused on approaches that emphasize the structural perspective on the dynamics of media use in social contexts. These arguments and findings, in sum, suggest a complex interrelation of media use and social structures. Hence, the co-orientation model by Newcomb (1953) not only proposes an approach to understand a triad of two persons and an object of reference. It actually proposes a network perspective on dynamic communication processes that builds on two basic assumptions: (1) Individuals are embedded in networks by ties to other persons and media contents, and (2) individuals act in dependence of this context and thereby shape the context for other individuals. As a result of this embeddedness, the behavior of the actors is dependent on a complex set of reinforcing or competing network constellations and not on a single triad. For example, influence processes are likely to depend on the number or proportion of influencing others in a network constellation and not on a single relation. In a stochastic model, the likelihood of being influenced may be dependent on the number of triads that meet the criteria (Ripley et al., 2018; Snijders et al., 2010). Alternatively, a threshold can be defined or empirically assessed that needs to be reached before an influence process occurs (Centola & Macy, 2007; Valente, 1995).

The focus of our empirical work lies in social relations by the means of friendship ties. This contrasts partially with the classic literature from media and communication research that typically focuses on interpersonal communication. We do so for four reasons. First, the described process of social influence may also be exerted by other (more implicit) means than interpersonal communication (e.g., observation and copying). Second, frequent interpersonal communication is a necessary, but not sufficient, factor for creating and maintaining friendship ties. Third, a friendship tie also includes a valence (i.e., a positive value) that is necessary for the concept of co-orientation since it builds on balance theory. Fourth, by analyzing friendship networks we can build a bridge to the sociological literature that provides a rich resource for modeling and interpreting dynamic social networks. Compared to the individual psychological and macro-sociological research approaches, we address an intermediary level with respect to both the number of actors considered and the time frame. We are interested in friendship networks (not single individuals, nor the whole society) and their dynamics over several weeks (not minutes/hours, nor years).

Hypotheses

From a social network perspective, four types of dynamics can be distinguished: (1) social selection, (2) social influence, (3) structural dynamics of media use, and (4) structural dynamics of friendship. Our research questions focus on the first two dynamics, since they are at the core of the co-orientation model; the other dynamics will be included by the means of control variables. Therefore, the goals of this project are to understand and disentangle which effect the social context has on individual media use (RQ1) and which effect media use has on the development and maintenance of social relations (RQ2). The literature review shows that these research questions address two perspectives (i.e., selection vs. influence) of a dynamic process. Most often, only one perspective is included in theoretical reasoning and empirical analysis at a time. However, since both processes are inherently related and may even lead to the same outcome (i.e., network-autocorrelation), both are included in our research approach. Moreover, by analyzing the dynamics of selection and influence simultaneously, we can disentangle them empirically (Steglich et al., 2010).

In the previous sections, we have referred to empirical findings from social network studies. According to these studies, preference for TV programs, movies, music styles, and screen time may be relevant for social influence and social selection processes among adolescents. We follow a similar empirical approach but focus on TV and YouTube, since YouTube use has become the most popular online activity of adolescents in Germany – the country in which the fieldwork was conducted (Feierabend et al., 2015, p. 26). For our empirical analysis, we specify our first assumption that both TV and YouTube use influence social structures by triggering social selection processes as follows:

H1: The use of (a) TV programs and (b) YouTube channels affects the formation of friendship ties among the pupils in a school grade (i.e., social selection).

Our second rationale is that the adoption of new TV programs and YouTube channels is (among others) the result of social influence processes. Since we are not interested in distinct communication roles such as opinion leaders and followers (Katz, 2015), we have grounded this assumption primarily in diffusion research. In our case, TV programs and YouTube channels represent the innovations. Hence, based on our second assumption that the adoption of new TV programs and YouTube channels is the result of social influence processes, we state our second hypothesis:

H2: The friendship structure among the pupils in a school grade affects the use of (a) TV programs and (b) YouTube channels (i.e., social influence).

Methods

The empirical investigation of our hypotheses requires longitudinal network data that include both social attraction and preferences for media content. As previously outlined, we focused on adolescents because of the vivid dynamics of media use and social structures. The following subsections describe the procedure of data collection, the measures, and the analytical approach.

Procedure

Data were collected in 2015 in secondary schools in a major German city. Three entire grade levels were chosen, with four to five classes each. This setting allows the inclusion of friendship ties across school classes and networks of 89 to 132 pupils (cf. Table 2). Participation rates ranged between 90% and 98% and were very satisfactory. The average age of the 336 participants was 17.3 years, and 55% were female. Procedures, questionnaires, and the data protection concept were approved by the educational authorities of the city and the schools. All pupils and their parents were informed beforehand by a postal letter and asked for written consent. Active consent was given by all pupils participating in the survey. For pupils that were under 16 years of age, active consent was obtained from parents or legal guardians. The surveys included three panel waves with an interval of eight weeks, and were conducted in the computer lab of the schools as computer assisted self-interviews (CASI). In the participating schools the main subjects are taught in traditional classes of fixed composition, but some of the subjects are taught as courses including pupils from different classes. The composition of such courses represents important social foci in which the pupils have regular opportunities to meet and socialize (Feld, 1981). This may lead to more nominations across classes compared to other studies.

Measures

Friendship Networks

To measure friendship ties within the grade levels, we used a so-called sociometric question asking for the names of pupils from the same grade level with whom they "like to spend time with and

whose opinion is important" to them. Respondents could name up to 20 persons by first name. An autocomplete function supported data entry and made sure that persons with the same first name were distinguished. Friendship nominations outside the same grade level or school were not possible, since the method requires having a defined set of actors and a high response rate. Both would not be possible if outside nominations could be included. By combining all friendship nominations of a survey wave, it is possible to construct a one-mode network (X) of the entire grade level that consists of a defined set of actors (N) who are connected by ties to each other (x_{ij}) for i, j ∈ N (i ≠ j; cf. Figure 1d). The panel design then allows the study of how this network evolves over time.

TV and YouTube Use

The frequency of TV and YouTube use was measured by days per week on which pupils typically used the respective media (8-point scale ranging from 0 (*never*) to 7 (7 days a week)). Based on the answers to a short survey prior to the actual panel survey, we were able to include a list of the 20 most popular series from TV and 20 most popular YouTube channels for each grade level. To account for changes in preferences, new TV programs and YouTube channels were added after each wave based on the most frequent answers to an open-ended question. This is why the number of TV programs and YouTube channels reported in Table 2 differs slightly between the grade levels (25–30 TV programs and 24–30 YouTube channels). Respondents were asked to indicate how often they watched new episodes of the respective TV programs and YouTube channels on a 5-point scale ranging from "never" to "always." As the regular use of content is of special interest here, the variables were dichotomized with a cutoff value of 4 (never was coded as 1; always was coded as 5). Some of the above-mentioned network studies have applied principal component analysis to identify genres and included media use as node attributes (Friemel, 2012; Shoham et al., 2012; Steglich et al., 2006). However, this implies a loss of information, and we therefore followed a new approach that treated media use as network data as well (Friemel, 2015; Lomi & Stadtfeld, 2014). These two-mode networks consist of two distinct sets of nodes. In our case, these are the node sets of pupils (N) and the media content (i.e., YouTube channels (C) and TV programs (P, cf. Figure 1d)). The ties (Y, Z) may only occur between the two sets, resulting in the two-mode network for YouTube in which the ties (y_{ic}) link a pupil (i) with a specific YouTube channel (c) (for $i \in N$, $c \in C$) and the two-mode network for TV in which the ties (z_{ip}) link a pupil (i) with a specific TV program (b) (for $i \in N$, $p \in P$). Also, these two-mode networks were measured at three time points and allow the study of dynamic changes over time. The two media types are included as two distinct node sets because both the patterns of use and the structure among the content may be different between the two types (cf. section on structural dynamics of media use).

Analysis

Analytical Approach

Social network analysis provides the necessary framework to describe and analyze relational data such as friendship and media use (Wasserman & Faust, 1994). More specifically, we applied stochastic actor-oriented modeling (SAOM), which consists of a family of statistical network models to investigate the dynamic co-evolution of social networks and actor attributes (actors' behaviors) as well as several social networks simultaneously (Snijders et al., 2013, 2010). Data analysis was conducted with RSiena, version 1.2–12 (Ripley et al., 2018) in R, version 3.5.0 (R Core Team, 2018).

The basic idea of SAOM is to take the observed network as a starting point and run simulations of how a social network would develop based on the effects included in the model. In our case, the observed networks include friendship among the pupils (X) and their media use (C, P). For each grade level, all three networks, frequencies of media use, and additional control variables (sex, age, and classroom membership) were included in a multilevel model (Lazega & Snijders, 2016). The

term *multilevel* refers to the fact that multiple networks with different node sets are included simultaneously and should not be confused with the idea of nested levels. Each grade level was analyzed separately. Hence, the resulting model parameters can be different between the three grades.

Model Specification

The inclusion of effects primarily follows theoretical assumptions but may be supplemented by model convergence and goodness-of-fit statistics. Our model can roughly be divided into two types of effects. First, there are within-network effects that model the dynamics within the friendship, TV, and YouTube use networks respectively. Second, there are between-network effects that model the co-evolution between the friendship network and the media use networks. In our study, the former serve as structural controls, while the latter allow us to test our hypotheses of selection (H1) and influence (H2). Table 1 illustrates the various effects visually. For example, the reciprocity effect models the tendency that an actor i creates a friendship tie to an actor j (dotted arc from i to j) at time point t if he/she was already nominated as a friend by this person at the previous time point t-1 (solid arc from j to i). Following the idea of balance theory, the creation of ties can also be dependent on indirect relations via a third person h. This includes transitive triplets, transitive reciprocate triplets, three-cycles, and transitive ties. Popularity and activity effects take the number of incoming or outgoing ties into account, while other effects are dependent on a node attribute (sex, classroom, and age). The latter effects help to control for network-autocorrelation regarding the most important control variables. Finally, the outdegree-trunc and the anti in-isolates effects control for the tendency that some pupils make or receive no nomination.

The *content co-nomination* effect (in RSiena, referred to as the "4-cycle effect") accounts for the extent to which pupils who share a preference of one media content (that is, e.g., watch the same TV program on a regular basis) also tend to agree on preference for other content (e.g., start to watch the same other TV program), no matter if they are related through a friendship tie or not. Hence, this effect is an indicator for the existence of inter-individual media repertoires that are independent of interpersonal influence via friendship ties. Detailed elaborations of all effects and their mathematical definitions can be found in the software manual for RSiena (Ripley et al., 2018).

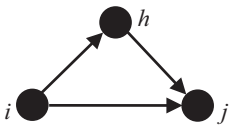
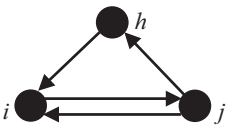
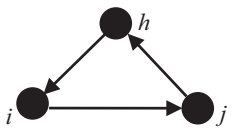
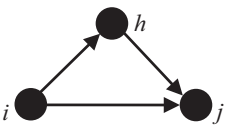
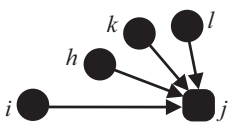
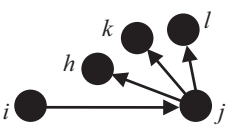
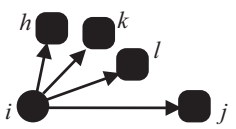
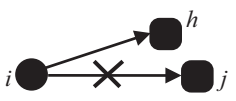
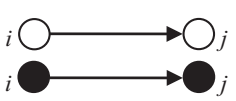
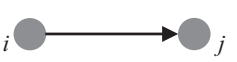
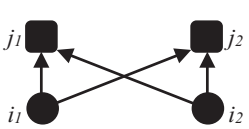
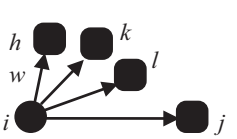
The two effects testing for selection and influence are between-network effects, which means that the ties in one network are dependent on the ties in the other network. The selection effect (H1: friendship from content agreement) represents the contribution to the log-probability of the tie x_{ij} and is proportional to the number of joint w choices of i (w_{ih}) and others (w_{jh}). This means that the more TV programs or YouTube channels two persons have in common, the more likely it is for them to be friends. Similarly, the influence effect (H2: friendship to content agreement effect) estimates the effect of the number of mixed two-paths (w_{ij} and x_{jh}) on x_{ih}. This means that the more friends are using a specific media content, the more likely it is that a person is using the same content as well. It is advisable to control both of these effects for the tendency that outgoing ties in the dependent network depend on the number of outgoing ties in the independent network, that is, whether pupils who nominate many friends also tend to use many media contents and vice versa. This is done with *W out-degree on X activity* effects.

Results

Descriptives

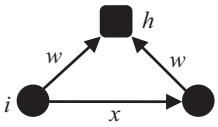
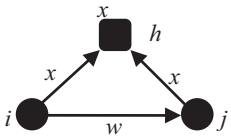
The lower part of Table 2 provides the descriptives for media use (reported as days per week) and the friendship networks. On average, pupils watch TV and YouTube on 4.0 to 5.2 days per week (with standard errors between 0.2 and 0.3). These numbers are substantially higher than the frequency of video gaming and somewhat higher than for Facebook and Instagram (not reported in detail here). The average number of TV programs that are regularly used by an average person lies between 1.0

Table 1. Model specification of stochastic actor-oriented models.

Effect name	Figure	Effect name	Figure
Within-network effects			
Out-degree (density) (parm. #1, 17, 22)		Reciprocity (parm. #2)	
Transitive triplets (parm. #3)		Transitive reciprocate triplets (parm. #4)	
Three-cycles (parm. #5)		Transitive ties (parm. #6)	
In-degree popularity (sqrt) (parm. #7, 19, 24)		Out-degree popularity (sqrt) (parm. #8)	
Out-degree activity (sqrt) (parm. #9, 20, 25)			
Out-degree trunc (1) (parm. #15, 21, 26)		Anti in-isolates (parm. #16)	
Sex alter (parm. #10)		Sex ego (parm. #11)	
Same sex/classr. (parm. #12, 13)		Age similarity (parm. #14)	
Content co-nomination (parm. #18, 23)		W out-degree (sqrt) on X activity (parm. #27, 28, 29, 30)	

(*Continued*)

Table 1. (Continued).

Effect name	Figure	Effect name	Figure
H1: Friendship from content agreement (parm. #31, 32)		H2: Friendship to content agreement (parm. #33, 34)	

Legend for arcs: solid = independent ties; dotted = dependent tie; dashed = indifferent number of actors may be involved
Legend for nodes: circles = social actors (pupils); rectangles = media content (TV programs/YouTube channels); rounded rectangles = social actors or media content (effect is applied to both types of nodes)
Legend for node color: white = female; black = male; gray = indifferent attribute

and 3.0, and is a bit higher than the number of YouTube channels that are selected out of the provided list (between 0.5 and 1.9). The mean degree and the density are reported as descriptives for the friendship networks. The *degree* represents the average number of ties per actor for each network and panel wave. The network *density* is defined as the number of existing ties in a network divided by the number of theoretically possible ties (i.e., the size of the grade level) and is an indicator for the connectivity of a network (Wasserman & Faust, 1994). The values are typically smaller for larger networks, since creating and maintaining friendship ties consumes time and other scarce resources. Hence, the denominator increases with the size of a network, while the number of friendship ties is usually limited. In our networks, the density values range from.036 to .078.

Finally, Table 2 reports the network dynamics. The Jaccard coefficient is a standardized measure for the stability of a network structure. Values close to 0 indicate high turnover, whereas values close to 1 indicate a static structure. Values of .3 and higher are recommended for the use of SAOM (Ripley et al., 2018), since this decreases the degrees of freedom of the possible effects that cause the change. Jaccard coefficients are computed for each pair of successive panel waves. The values between .43 and .59 for friendship dynamics, .28 to .55 for TV program dynamics, and .34 to .46 for YouTube channel dynamics indicate a reasonable amount of variation for analysis.

Stochastic Actor-oriented Model

Table 3 reports separate models for each of the school grades, denominated by their grade level (10, 11, and 12). The estimation process for the parameters follows an iterative process to minimize the difference between the simulated outcome and target statistics computed from the observed networks at subsequent time points. All effects model the probability that an actor *i* creates (or maintains) a tie to another actor or media content *j* dependent on the configuration of their personal network (i.e., ties to other actors and media contents or actor attributes, as illustrated in Table 1). The effect sizes are reported as log odds and odds ratios (OR) that can be interpreted similarly to coefficients from logistic regression. The standard errors (SE) of the log odds further allow the identification of effects that are significantly different from zero. The results for the control parameters are in line with what is expected based on theoretical arguments and other studies of adolescent friendship networks. Convergence indicators for all models (< 0.12) are satisfactory. The standard goodness-of-fit statistics show no significant deviations from the empirical networks. Therefore, we are confident that the models provide a solid basis to test the hypotheses. The next two subsections are divided into results for control variables and hypothesis testing.

Control Variables

Above, we argued that co-orientation is not independent from other social processes. If we are to identify its "net value," we have to take into account that it is embedded in and influenced by other

Table 2. Descriptive statistics of media use and friendship networks.

Grade Level	10				11				12			
Classes	4				5				4			
Pupils	89				115				132			
Participants (%)	79 (90)				107 (93)				129 (98)			
Mean age	16.7				17.0				18.0			
Female (%)	48				62				53			
TV programs	28				30				25			
YouTube channels	27				30				24			
Panel Wave	Ø	W1	W2	W3	Ø	W1	W2	W3	Ø	W1	W2	W3
Media use (days per week); mean (SE)												
TV	4.3 (0.28)	4.6 (0.25)	4.3 (0.29)	4.1 (0.30)	4.5 (0.28)	4.5 (0.26)	4.6 (0.26)	4.3 (0.33)	4.9 (0.24)	5.2 (0.20)	5.0 (0.23)	4.5 (0.30)
YouTube	4.6 (0.27)	4.8 (0.26)	4.8 (0.27)	4.3 (0.29)	4.9 (0.25)	4.7 (0.25)	4.9 (0.22)	5.1 (0.26)	4.1 (0.24)	4.0 (0.22)	4.3 (0.22)	4.0 (0.28)
Number of TV programs and YT channels; mean (SE)												
TV programs	1.8 (0.23)	1.7 (0.18)	2.0 (0.24)	1.8 (0.26)	2.3 (0.24)	2.4 (0.22)	3.0 (0.28)	1.4 (0.21)	1.7 (0.18)	2.1 (0.19)	2.2 (0.21)	1.0 (0.15)
YouTube channels	1.5 (0.25)	1.4 (0.22)	1.8 (0.29)	1.2 (0.24)	1.5 (0.20)	1.7 (0.18)	1.9 (0.22)	1.1 (0.21)	0.8 (0.15)	0.8 (0.14)	1.1 (0.18)	0.5 (0.13)
Friendship networks												
Mean degree	5.5	5.1	6.1	5.2	6.1	6.6	5.9	5.9	6.0	6.6	6.6	4.7
Density	.070	.065	.078	.068	.054	.058	.051	.052	.046	.050	.051	.036
Dynamics; Jaccard	W1 → W2		W2 → W3		W1 → W2		W2 → W3		W1 → W2		W2 → W3	
Friendship	.45		.48		.53		.59		.48		.49	
TV programs	.45		.55		.39		.50		.50		.28	
YouTube channels	.34		.45		.45		.43		.45		.46	

Table 3. Stochastic actor-oriented model for co-evolution of friendship network and media content preferences.

Grade	10			11			12		
Model Effect	Estimate	SE	OR	Estimate	SE	OR	Estimate	SE	OR
All convergence t-ratios <	0.04			0.04			0.04		
Overall maximum convergence	0.11			0.12			0.12		
Dynamics of friendship networks (within-network)									
1) Out-degree (density)	-1.296***	0.337	0.274	-2.159***	0.377	0.115	-2.257***	0.405	0.105
2) Reciprocity	2.304***	0.169	10.01	2.189***	0.256	8.923	2.130***	0.244	8.418
3) Transitive triplets	0.454***	0.041	1.575	0.380***	0.062	1.462	0.533***	0.058	1.704
4) Transitive reciprocate triplets	-0.372***	0.070	0.689	-0.261*	0.103	0.770	-0.313**	0.107	0.731
5) Three-cycles	0.019	0.066	1.020	0.000	0.117	1.000	-0.185†	0.103	0.831
6) Transitive ties	0.516***	0.105	1.675	0.870***	0.196	2.386	0.911**	0.219	2.488
7) In-degree popularity (sqrt)	-0.027	0.084	0.973	0.091	0.126	1.095	-0.054	0.119	0.947
8) Out-degree popularity (sqrt)	-0.553***	0.078	0.575	-0.560***	0.131	0.571	-0.329**	0.107	0.720
9) Out-degree activity (sqrt)	-0.125†	0.064	0.882	-0.145*	0.063	0.865	-0.196**	0.073	0.822
10) Sex alter	-0.024	0.079	0.977	0.221†	0.116	1.247	0.140	0.101	1.150
11) Sex ego	-0.093	0.088	0.911	-0.092	0.114	0.912	0.102	0.106	1.107
12) Same sex	0.181*	0.077	1.199	0.327**	0.101	1.387	0.174†	0.103	1.190
13) Same classroom	0.423***	0.074	1.527	0.343***	0.099	1.410	0.303***	0.084	1.641
14) Age similarity	0.516**	0.192	1.675	0.848**	0.277	2.336	0.495*	0.235	1.354
15) Out-degree trunc (1)	-2.840***	0.539	0.058	-	-	-	-2.196**	0.735	0.111
16) Anti in-isolates	-	-		-	-	-	-1.624*	0.782	0.197
Dynamics of TV program preferences (within-network)									
17) Out-degree (density)	-4.551***	0.576	0.011	-1.878**	0.675	0.153	-2.278*	0.889	0.102
18) TV program co-nomination	0.031	0.026	1.031	0.047**	0.015	1.048	0.023**	0.008	1.024
19) In-degree popularity (sqrt)	0.268*	0.133	1.307	0.027	0.111	1.027	0.167	0.103	1.182
20) Out-degree activity (sqrt)	0.793**	0.172	2.210	-0.136	0.205	0.873	-0.085	0.235	0.919
21) Out-degree trunc (1)	-	-	-	-	-	-	-2.297***	0.635	0.101
Dynamics of YouTube channel preferences (within-network)									
22) Out-degree (density)	-2.200*	1.096	0.111	-3.202***	0.659	0.041	-3.201*	1.260	0.041
23) YouTube channel co-nomination	0.064	0.051	1.066	0.057**	0.018	1.059	0.043	0.033	1.043
24) In-degree popularity (sqrt)	-0.122	0.261	0.885	-0.112	0.178	0.894	0.365	0.237	1.441
25) Out-degree activity (sqrt)	0.179	0.312	1.196	0.548***	0.128	1.730	0.149	0.356	1.161
26) Out-degree trunc (1)	-2.386**	0.733	0.092	-	-	-	-2.720***	0.764	0.066
Dynamics between media use and friendship networks (network co-evolution)									
27) TV program out-degree (sqrt) on friendship activity	0.338**	0.107	1.401	0.147	0.099	1.158	-0.197*	0.080	0.821
28) YT program out-degree (sqrt) on friendship activity	0.052	0.064	1.053	-0.114	0.077	0.892	-0.267*	0.070	0.765
29) Friendship out-degree (sqrt) on TV program activity	-0.556**	0.188	0.574	-0.220	0.147	0.802	-0.269	0.172	0.764
30) Friendship out-degree (sqrt) on YT channel activity	-0.653*	0.292	0.521	-0.673**	0.206	0.510	-0.146	0.249	0.864

(*Continued*)

Table 3. (Continued).

Grade	10			11			12		
Model Effect	Estimate	SE	OR	Estimate	SE	OR	Estimate	SE	OR
H1: Social selection									
31) Friendship from TV program agreement (H1a)	0.015	0.116	1.015	-0.020	0.095	0.980	0.115	0.076	1.122
32) Friendship from YT channel agreement (H1b)	0.086	0.096	1.090	0.115	0.098	1.122	0.109	0.095	1.115
H2: Social influence									
33) Friendship to TV program agreement (H2a)	0.398**	0.154	1.489	0.317***	0.089	1.373	0.207*	0.103	1.230
34) Friendship to YT channel agreement (H2b)	0.596*	0.275	1.815	0.498***	0.142	1.645	0.478**	0.158	1.613

Cell entries are parameter estimates as log odds (estimate), standard error of estimates (SE), and odds ratio (OR).
p-values + < 0.1; *<0.05; **< 0.01; ***< 0.001.

social processes. Consequently, in adolescent friendship networks we need to control for the general social dynamics typically found in social network studies (effects #1–16 in Table 3). The conceptual idea of these effects is illustrated in Table 1 and briefly described in the Methods section. The detailed mathematical description of the effects and additional guidance for their interpretation can be found in the SIENA user manual (Ripley et al., 2018). The out-degree (density) effects (effects #1, #17, and #22) control for the tendency that actors in a network create and sustain ties at all, and as such are mandatory to be included for each network layer. Similar to intercepts in regression analyses, their parameters are estimated, but usually not interpreted in detail. Since the creation of new ties in our types of networks is dependent on limited resources (e.g., time to use media or to spend with friends), the effects are expected to be negative. This reflects the fact that social networks are usually very sparse. The positive and significant parameter estimates for reciprocity (#2) indicate that actors show a strong tendency to reciprocate friendship nominations from others. The odds ratio of 10.01 for grade level 10, for example, indicates that reciprocating an incoming friendship tie is about 10 times as likely as establishing a tie to a random actor, everything else being constant. The results for the subsequent effects can be interpreted likewise. In sum, all three models indicate a high level of reciprocity and network closure that leads to the formation of densely knit groups of friends and status hierarchies with respect to popularity within each grade level (#3–#6). The out-degree popularity effect (#8) models the tendency that actors *i* have friendship ties with actors *j* who nominate a high number of other actors (*h, k, l*, etc.) as friends. This effect is negative and significant for all three grades, indicating that pupils who reach out to many others are less likely to be nominated themselves. Females and males have about the same likelihood to receive and send friendship ties (#10, #11), while similarity for sex, classroom, and age are of relevance for the formation of friendship ties in all grade levels (#12–#14). The outdegree-trunc and anti in-isolates effects (#15, #16) had to be included in some of the networks to increase the goodness-of-fit statistics and are neither theoretically informed nor explicitly interpreted. In sum, the dynamics found are in line with what can be expected from friendship structures among adolescents and are indicators for reasonable models.

The respective dynamics for the two-mode networks of TV program and YouTube channel use are reported in the second and third block of parameters (#17–26). A positive effect for content co-nomination (effects #18 and #23) indicates a clustering of the contents used. Hence, at least some of the media use can be attributed to inter-individual media repertoires that are independent from friendship structures. Similar to the friendship networks, out-degree popularity effects refer to preferential attachment in using specific content (i.e., popular contents are more likely to be selected). Significant

effects are found for TV programs (#19) in grade 10, but not for YouTube (#24). On the other hand, the out-degree activity effects model the variance of pupils' TV (#20) and YouTube (#25) use. Significant effects are found for TV programs in grade 10 and YouTube channels in grade 11. The positive effects indicate that more avid users are more likely to select additional contents. Finally, outdegree-trunc (1) effects control for pupils who did not indicate using at least one of the provided TV programs or YouTube channels on a regular basis (#21 and #26).

Hypothesis Testing

The effects in the fourth block model the co-evolution between the friendship and the media use networks and test the hypotheses on co-orientation. Four degree-based effects control for the dependencies of friendship nominations on the number of ties in a media use network (#29, 30) and vice versa (#31, 32). They are not explicitly interpreted. The social *selection hypothesis* (H1) is tested by a triadic effect accounting for the formation of a friendship tie from pupils *i* to pupils *j* who prefer the same TV program (H1a) or YouTube channel *h* (H1b) respectively (friendship from content agreement, #31 and #32, cf. Table 1 and Figure 1b). Over all models, the effects for social selection are non-significant. Thus, H1a and H1b are not supported for all three grade levels. Likewise, the social *influence hypothesis* (H2) is tested by a triadic effect modeling the regular use of a TV program or YouTube channel that is already used by a friend (friendship to content agreement, #33 and #34, cf. Table 1 and Figure 1c). The results show positive and significant parameters for the influence on TV program use as well as on YouTube channel use over all models. Thus, H2a and H2b are supported for all three grade levels.

Discussion

Social Dynamics of Adolescents' Media Use

Based on the literature review, there are plausible arguments for both selection and influence regarding adolescents' media use. Hence, our first hypothesis (H1) states that the use of TV programs and YouTube channels affects the formation of friendship ties among the pupils in a school grade (i.e., social selection). The results show that no significant effects are found for either TV or YouTube use, so H1a and H1b are not supported. This finding stands in contrast to previous studies of social network dynamics and media use that have found social selection effects (Friemel, 2012; Steglich et al., 2006). However, it can reasonably be assumed that this difference can be explained by the study design. In contrast to Friemel (2012), the observed networks were not collected in newly formed school classes but in more settled settings. The friendship networks were observed during the second half of the 10th, 11th, and 12th grades, and the pupils had already spent quite some time in the given setting. Therefore, it cannot be ruled out that social selection processes took place prior to data collection. Nevertheless, it is important to include selection effects in the model, since influence processes are likely to be overestimated otherwise (Friemel, 2015; Steglich et al., 2010). The second hypothesis (H2), that friendship structure among the pupils in a school grade affects the use of TV programs and YouTube channels (i.e., social influence), is supported by significant and positive estimates for TV (H2a) and YouTube (H2b) throughout all grade levels. Hence, pupils are more likely to use a TV program or a YouTube channel that is already used by their friends. The odds ratio of 1.8 that is found for the 10th grade indicates that having friends who watch a specific channel increases the likelihood for the respective person by 80% to start using this channel (compared to a channel none of his or her friends are using). This finding is in line with the findings from diffusion research and emphasizes the necessity to take the social context into account when studying individual media use. To our knowledge, this is the first empirical study that includes specific TV programs and YouTube channels (instead of genres) that also controls for rivaling explanations. In addition to the social selection processes, this includes content *co-nomination* as a third possible explanation for the emergence of homophilic media use in

social networks. The positive and significant effects of co-nomination in three instances refer to underlying, but not observed in detail, characteristics of the content (e.g., program structure), the pupils (e.g., personality types), and implicit influence processes. *Implicit influence* in this context refers to influence that was not captured by the friendship structures (e.g., hyperlinks between the YouTube channels, or if a person admires another person but is not befriended). Hence, the visibility of others' media use (either on the Internet or in everyday life) may have an additional influence that was not covered by our research setting (Johnson & Van der Heide, 2015). Nevertheless, controlling for these rivaling explanations is an advance, since most other studies are limited to *explicit* forms of interpersonal communication, electronic media, advice seeking, etc. (Markus, 1987). A detailed analysis of the role of media-related conversation and its relationship with friendship ties is provided in a separate publication (Friemel & Bixler, 2018). Hereby it was found that conversations regarding the two media types are equally frequent, but the structural similarity of friendship and conversation networks is stronger for YouTube than for TV. This finding establishes the ground for two possible explanations. First, influence processes may be stronger for YouTube than for TV. Second, conversations may play a different role for the two media types. The first explanation is supported by the estimated effect size for influence that is higher for YouTube. The second explanation can be addressed with the examination of communicative channels that are used for media-related conversations. A plausible hypothesis would be that YouTube-related interactions are more frequent on messenger services (e.g., WhatsApp) since references to its content can be embedded more easily (e.g., using hyperlinks) than references to TV programs. However, it turns out that TV-related interactions are more frequent both in WhatsApp group chats ($M_{TV} = 2.17$; $SE_{TV} = 0.12$; $M_{YT} = 1.88$; $SE_{YT} = 0.10$), $t(106) = 2.89$, $p < .05$, $r = .27$, as well as in direct messages ($M_{TV} = 2.49$; $SE_{TV} = 0.12$; $M_{YT} = 2.09$; $SE_{YT} = 0.10$), $t(106) = 3.51$, $p < .001$, $r = .32$. Given these inconclusive findings, the parallels and differences between the different networks and the potential mediating role of conversation via different channels require additional investigation that goes beyond the scope of this article.

In sum, we have found sound evidence that individual media use is affected by one's friendship network by the means of interpersonal influence. Furthermore, there is moderate evidence for content co-nomination that is likely to be related to unobserved characteristics of the content, personality, and implicit influence processes. No support was found for processes of social selection.

Linking the Micro-, Meso-, and Macro-level

To our knowledge, this is the first study applying a multilevel social network approach to analyze the use of two media types simultaneously. Beyond the findings regarding adolescents' TV and YouTube use and the methodological case study, this article also contributes to a broader and longer-lasting discussion of linking the micro-, meso-, and macro-levels of empirical research. Combining the co-orientation approach with social network analysis provides the opportunity to link the micro behavior of individuals to the meso-level of social dynamics and finally the macro outcomes on the level of societies and media markets. The triadic constellation of co-orientation (i.e., two persons and one media content) is typically part of larger and more complex network structures. Simmel noted that individuals are simultaneously embedded in a variety of partially overlapping "social circles" of different persons and subject matters (Simmel, 1908). Hence, the triads, as well as other structural effects on the level of dyads and triads, can be regarded as building blocks for larger network structures. This argument for a relational perspective to link the micro-, meso-, and macro-levels can be found in both communication research (Monge & Contractor, 2003; Rogers & Kincaid, 1981) and social science in general (Coleman, 1986). For example, Chaffee argues that by focusing on "micro-social events," as addressed in the co-orientation model, we may find more valid explanations for societal phenomena than by focusing on individual persons as units of analysis (Chaffee, 1973). Despite this call for respective theories and research designs, only a handful of publications address the intermediate level of social structures (Friemel, 2012, 2015; Lewis et al., 2012; Lomi & Stadtfeld, 2014; Shoham et al., 2012; Steglich et al., 2006) and fill the gap between the

psychological micro-perspective of traits and needs on one side and the sociological macro-perspective of diffusion, societal stratification, and media use patterns on the other side. The two media types investigated in this study (i.e., TV and YouTube) provide an abundant variety of content, and the distribution of users along these contents follows a long-tail distribution. This means that a few programs and channels are used by a large share of users while most other programs and channels have a very limited reach. Our findings show that the micro-level dynamics of social influence have a substantial effect on media use on the meso-level of social networks. It is important to note that the social influence among friends seems to be more relevant than the popularity by other persons. In our model, the general popularity of a content (modeled by the in-degree popularity effect) was only significant in one grade level regarding TV programs, but not for YouTube. This means that the success of a TV program or YouTube channel cannot be explained only by its content or its general popularity. It is the very local social network of friends that drives the use of TV programs and YouTube channels and ultimately supports their diffusion. For methodological reasons, the networks we have studied were clearly bounded (school grades). However, these densely knit networks within a school are part of larger networks that link pupils with members of other schools, sport clubs, siblings, informal peer groups, and ultimately with all other media users (Travers & Milgram, 1969). Therefore, we can assume that the influence effect we have found on the meso-level does scale up in these larger networks and is likely to be an important driver for the long-tail distribution of media use on the macro-level.

Limitations

We would like to point to four limitations of this study. First, the survey-based approach limited the number of media contents and panel waves that were feasible to be included. Hence, the study is limited to the most popular contents and their repeated use. Dynamics with respect to contents that are not part of a serial format (e.g., a single YouTube video) would require a different research design. Second, personality traits and content-related influences as rivaling explanations for media use patterns were not studied in detail. Besides controlling for content co-nomination (i.e., the 4-cycle effect), future studies on online media should try to include information regarding content-related structures such as hyperlinks. Third, by focusing on friendship networks, we were not able to illuminate the process of social influence and the role of different communication channels (e.g., face-to-face conversation vs. messenger services) in detail. Fourth, due to the network approach, the empirical findings are limited to a non-representative set of three school grades. Both our theoretical arguments and our empirical findings for co-orientation processes suggest that media use is likely to vary across different networks even when other aspects are held constant. Hence, we refrained from interpreting the details between the grades in more detail. However, we think that our findings hold more generally for adolescents for the following reasons: (1) The main findings are consistent across the three grades; (2) the main findings are in line with other studies; (3) the findings regarding social influence are in line with the theoretical argumentation and there are plausible arguments why selection processes were not found; (4) the findings are in line with common sense about media use among adolescents; and (5) the long-tail distribution of media use that is well documented by applied media research is likely to be a consequence of the social dynamics found.

Conclusions

The contribution of this study is fourfold. First, we propose co-orientation as a theoretical foundation that helps to integrate two distinct but related dynamics (i.e., selection and influence) that are of relevance for media use research. It is suggested that this integrative power of the theory should be applied to other fields of media use and media effects research, such as the modeling of the public sphere (Waldherr, 2014). Second, we provide an empirical case study for how to investigate the social dynamics of media use. This includes both the procedures of data collection and their analysis. Third, we provide empirical insights into the social dynamics of TV and YouTube use among adolescents that demonstrate the necessity to take the social context into account when studying

media use. Since the data of adolescents' media use are often collected in schools, one should be careful with statistical methods that assume independence in the cases. Fourth, this paper is one of few empirical investigations that combines data on individual media use with relational information between media users and thereby provides insight into the link between different analytical levels and the temporal dynamics of media use. It illustrates the application of a methodological approach that helps to close the gap between the micro- and meso-levels in communication research. We have reason to conclude that the triads of co-orientation serve as building blocks for large-scale patterns that lead to emergent phenomena such as the long-tail distribution that can result from influence processes. Hence, based on theoretical arguments and other data sources, it is possible to include the macro-level at least to a certain extent. These contributions are closely linked to the application of agent-based modeling in general and SAOM in particular. Neither the simultaneous analysis of selection and influence processes nor the analysis of the relation between the micro- and meso-levels would have been possible without this methodological approach. Besides testing hypotheses of network dynamics and emergent phenomena, the methodological approach also has the potential to stimulate theoretical advances. Future theories may profit from the necessity to make the assumption of dynamic processes more explicit. This includes both the locus of agency and the rationale of which conditions are relevant for decisions made by the actors.

Given the focus on two media types (i.e., TV and YouTube) and a specific age group, it would be important to replicate this study in other schools but also to extend it to other settings and media types. Given our findings, future studies on network dynamics among adolescents should consider media use as a relevant cause (and effect) of social structure and therewith related behavior. As suggested by the findings for music, other media types such as the ones analyzed in this study could also be used as a badge for values or behavior (Boer et al., 2011; Frith, 1981). Furthermore, besides the sociological, economic, and political relevancy of understanding the dynamics of media use by itself, these dynamics may be of relevance to understand other behavior that is related to media use. With respect to adolescents, this may include tobacco and alcohol use or school achievement.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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