Stigma and stress

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Chapter 3
Peers and Homophobic Attitudes in Adolescence: Examining Selection and Influence Processes in Friendships and Antipathies[1]

This study aimed to extend previous research on adolescents' homophobic attitudes by examining selection and influence processes in friendship relationships using longitudinal social network analysis. Furthermore, following suggestions made in the field of attitude dynamics, this study investigated whether adolescents actively distanced themselves in terms of homophobic attitudes from peers they disliked (antipathies), or were prone to dislike peers with different levels of homophobic attitudes. Data came from three Dutch high schools across two waves (ages 11-20, N = 1,935, 51.5% girls). Results showed that adolescents adjusted their homophobic attitudes to their friends' homophobic attitudes. Limited evidence was found for effects of antipathies on homophobic attitudes. No selection effects were found, yet in one school results suggested that adolescents were more likely to select others as friends when they were dissimilar in homophobic attitudes. Supplementary analyses were run to check whether effects differed by school grade or gender, finding no evidence for that.

3.1 Introduction

Homophobic attitudes and behavior are a widespread problem amongst adolescents. Recent studies report that approximately half of all adolescents fall victim to homophobic name-calling over the course of adolescence, with same-sex attracted boys running a particularly high risk (Collier, Bos, et al., 2013; Slaatten, Anderssen, & Hetland, 2015). Being the target of homophobic behavior has detrimental effects on the mental health of both lesbian, gay, and bisexual (LGB) (Aragon, Poteat, Espelage, & Koenig, 2014) and heterosexual students (Slaatten, Anderssen, et al., 2015). As homophobic attitudes serve as an important prerequisite for the expression of homophobic behavior in adolescence (Poteat, DiGiovanni, & Scheer, 2013; Poteat, Rivers, & Vecho, 2015), a thorough understanding of their origins is warranted.

Previous research has found that peers affect the way adolescents think about homosexuality. The aim of the present study was to extend knowledge on this topic by investigating the role of positive (friendships) and negative (antipathies) peer relationships in the development of homophobic attitudes in adolescence. Specifically, we were interested in studying to what extent homophobic attitudes are influenced by friends' and antipathies' homophobic attitudes, and whether homophobic attitudes serve as a selection criterion for the formation of friendship and antipathy relationships. Data came from the Peers and the Emergence of Adolescent Romance (PEAR) study, a Dutch short-term longitudinal sample on adolescent romantic and sexual development. Longitudinal social network analyses were employed, which allowed us to disentangle peer influence processes from selection processes regarding homophobic attitudes in both positive and negative peer relationship networks simultaneously (Snijders, van de Bunt, & Steglich, 2010).

3.2. Background and hypotheses

Homophobic attitudes in adolescence. Adolescence is the life phase of biological maturation (Eveleth & Tanner, 1990; Malina, Bouchard, & Bar-Or, 2004). Consequently, it is also the period during which sexuality and sexuality-related matters become salient. Engagement in sexual and romantic behavior is considered a normative aspect of adolescent development (Collins, Welsh, & Furman, 2009). In fact, the majority of adolescents in Western countries start to become sexually active during adolescence (Maticka-Tyndale, 2008; Mercer et al., 2013).

The impact of sexual development in adolescence extends to factors other than actual sexual behaviors, such as sexual identity development (Russell, 2005). A problematic component of sexual identity development is the establishment of homophobic attitudes. For instance, sexual identity strength is (amongst heterosexual adolescents) associated with higher levels of homophobic prejudice (Poteat et al., 2013). This indicates that adolescents whose sexual orientation is highly important to them may

be more likely to view others through this categorical lens and to develop stereotypes and prejudice related to sexual orientation (Bigler & Liben, 2006). Consequently, they may make greater efforts to ensure that their own sexual orientation is known to others. In line with this, the display of homophobic attitudes amongst adolescents in general and adolescent boys in particular, has been identified as a strategy to develop and demonstrate one's heterosexual, masculine identity to peers (McCann, Minichiello, & Plummer, 2009; Plummer, 2001; Slaatten et al., 2014).

In addition to showing heterosexuality to peers, adolescents may display homophobic attitudes as a bullying strategy for the acquisition of social status (Poteat & DiGiovanni, 2010). The display of homophobic attitudes is argued to serve two purposes as a bullying strategy. First, it may lead to the emasculation of its targets, thereby undermining their social status, especially amongst boys. Second, given the still marginalized and stigmatized position of sexual minority individuals in society, expressing homophobic attitudes may carry greater weight than other means for harassing peers. Although the link between homophobic attitudes and homophobic bullying is strongest in boys, girls high in prejudice have also been found to opt for the usage of homophobic language as a bullying strategy (Poteat & DiGiovanni, 2010).

In sum, homophobic attitudes seem to play a salient role in the lives of adolescents. They are at their peak during early to middle adolescence, dropping in subsequent life stages, by the time people have established their sexual identities (Horn, 2006; Robinson et al., 2013).

Peers and homophobic attitudes. The social salience of homophobic attitudes in adolescence suggests that peers may play a vital role in the development and expression of them. In general, peers become increasingly important in adolescence (Bukowski, Laursen, & Rubin, 2018) and are of substantial significance for the development of attitudes (e.g., Santos, Kornienko, & Rivas-Drake, 2017; van Zalk et al., 2013). In line with this, recent studies suggest that adolescents' homophobic attitudes are subject to peer influence. For instance, classroom levels of homophobic attitudes have been found to be predictive of individual level aggression towards male schoolmates who were perceived as gay (Prati, 2012). Relatedly, a study on Norwegian adolescents revealed that having heard a peer call another one gay-related names strongly predicted respondents' likelihood to resort to homophobic name-calling (Slaatten, Hetland, & Anderssen, 2015). Within the larger peer group, friends have been found to be of particular importance for the homophobic attitudes of adolescents. Using multilevel modelling, several studies have shown that mean levels of homophobic attitudes and behavior within ones' friendship group account for a substantial part of adolescents' homophobic attitudes and behavior (Birkett & Espelage, 2015; Poteat, 2007; Poteat et al., 2015). Furthermore, initial levels of homophobic attitudes of friends were predictive of adolescents' homophobic attitudes in subsequent waves, suggesting peer influence. Taken together, due to the pervasiveness and social salience of homophobic attitudes during adolescence, and in line with earlier research, we expected that over time,

adolescents' homophobic attitudes become more similar to their friends' homophobic attitudes (H1).

Peer influence with regard to homophobic attitudes could also results in other consequences than the merger of attitudes of friends. For instance, adolescents might distance themselves from others with homophobic attitudes that differ from the ones they uphold. As argued above, the expression of homophobic behavior and name-calling towards peers can be used in an effort to maintain and position oneself within adolescent peer groups (McCann et al., 2009; Plummer, 2001). A logical extension of this process is actively distancing oneself from peers who are very accepting of homosexuality, in order to pronounce existing differences and stress the portrayal of a heterosexual self-image. And, vice versa, is it feasible that adolescents who are accepting of homosexuality find it important to distinguish themselves from homophobic peers.

These mechanisms are in line with studies on polarization. Social influence has traditionally been defined as a process of opinion averaging (Berger 1981; Friedkin and Johnsen 1990). Opinion averaging may indeed comprise an important component of social influence. At the same time, theoretical and simulation studies have concluded that defining social influence as opinion averaging will inevitably lead to opinion convergence in groups or even societies (Berger, 1981; Friedkin & Johnsen, 1990; Mäs & Flache, 2013). Consequently, using such a narrow definition of social influence is not feasible for explaining the persistence of diversity in, or even polarization of opinions (Baldassarri & Gelman, 2008; Dandekar, Goel, & Lee, 2013; Mäs & Flache, 2013). Therefore, it has been argued that several other mechanisms of social influence exist. One such a mechanism is negative influence, or actively distancing in attitudes (Flache & Macy, 2011). Although authors studying negative influence have argued how discrepancies between actors might elicit negative influence for multiple traits, a prominent expectation is that negative influence might occur between people that do not like each other (Takács, Flache, & Mäs, 2016). This idea resonates with balance theory and the theory of cognitive dissonance (Heider, 1946; Festinger, 1957), which assert that people prefer to be in a situation of cognitive consistency. In the face of antipathies, this is achieved by disagreeing with people you dislike on issues that are socially salient (Heider, 1946). Given the ubiquity of homophobic attitudes in the adolescent peer context (Collier, Bos, et al., 2013; Slaatten, Anderssen, & Hetland, 2015), we believe that homophobic attitudes are a trait that could trigger such a process. Therefore, we test whether such negative influence processes with regard to homophobic attitudes can be found between adolescents that dislike one another. More specifically, we expect that over time, *adolescents' homophobic attitudes become more dissimilar to their antipathies' homophobic attitudes (H2).*

Selection mechanisms in adolescents' homophobic attitudes. It is important to note that peer influence in homophobic attitudes can only be properly studied when selection processes are also taken into account. That is, when studying social influence, one should control for selection processes that might serve as an

alternative explanation for (dis)similarity in homophobic attitudes between peers. Selection is often based on similarity on certain traits, such as homophobic attitudes. As such, similarity has proven to be an important characteristic for friendship selection (McPherson, Smith-Lovin, & Cook, 2001). As an explanation for this so-called homophily principle, it has been argued that similarity in traits might stimulate friendship creation as it leads to increased trust and shared knowledge, eases communication, and fosters mutual understanding (see McPherson et al., 2001).

Correspondingly, similarity in attitudes has long been recognized as an important driver of (friendship) selection (Huston & Levinger, 1978; McPherson et al., 2001). Selection will most likely occur on attitudes that are socially salient. Homophobic attitudes occupy such a position in adolescence, given the pervasiveness of homophobic prejudice within the adolescent peer context (Horn, 2006) and the strong link between homophobic attitudes and sexual identity development (Poteat et al., 2013). Furthermore, although homophobic attitudes themselves are a nonvisible trait, its consequence can be visible, for instance through the verbalization of attitudes during conversations or via the display of homophobic behavior and the usage of homophobic epithets. This attests the social salience of homophobic attitudes and furthermore enables selection on (homophobic) behavior, another important driver behind the homophily principle (McPherson et al., 2001). In sum, we expect selection on homophobic attitudes to play a role in the establishment of friendships. These expectations were tested in our third hypothesis, which states that *adolescents are more likely to select others as friends when they are similar in homophobic attitudes (H3).*

Notably, when people endorse very different homophobic attitudes, a reversed pattern could occur. That is, in addition to fostering interaction between adolescents with similar homophobic attitudes, dissimilarity in homophobic attitudes may cause adolescents to avoid social interaction, or go as far as to dislike each other. This is often referred to as the *repulsion hypothesis*, which states that dissimilarity in attitudes leads individuals to evaluate each other negatively (Rosenbaum, 1986; Takács et al., 2016). From a relational perspective, such a process entails the establishment of an antipathy relationship between two individuals with very different homophobic attitudes. Following the argumentation of the repulsion hypothesis, dissimilarity in homophobic attitudes should lead to disliking between adolescents, or, put differently, that *adolescents are more likely to select others as antipathies when they are dissimilar in homophobic attitudes (H4).*

Together, this study utilizes longitudinal social network modelling to test how homophobic attitudes are shaped by and shape friendships and antipathies in adolescence. Whilst testing these processes, we control for gender, ethnicity, and sexual orientation in the development of friendship and antipathy networks, as well as homophobic attitudes.

3.3. Method

Sample. Data came from the Peers and the Emergence of Adolescent Romance (PEAR) study, a Dutch short-term longitudinal sample on adolescent romantic and sexual development. The sample used in this study consisted of all students of three high schools located in two municipalities in the northern part of the Netherlands. The original sample included a fourth school. This school contained a practical education track, within which students spent a substantial proportion of time doing work placements. Consequently, more than a quarter of students from this school was absent during both waves of the study. As this proportion exceeds the maximal tolerable proportion of missing data advised for the employment of longitudinal social network analysis (Huisman & Steglich, 2008), this school was excluded in the present study. The average disposable income in the two municipalities where the schools are located lied at the country average. Both municipalities were homogenous in terms of ethnic composition, with only 3.6% of the total population having a non-Western background.

A sample overview per school is provided in Table 3.1. Respondents (N = 1,935, 51.5% girls) were 11 to 20 years of age, with 47.4 % registered for lower level educational tracks (i.e., preparatory secondary education for technical and vocational training) and 52.6 % registered for higher level educational tracks (i.e., preparatory secondary education for higher professional education and university). The percentage of sexual minority respondents ranged between 5.6% in School 1 and 6.5% in School 2. Almost all students were born in the Netherlands, as was the large majority of their parents. Some differences between schools existed with regard to parental ethnicity: respectively 19.7% and 15.9% of respondents had fathers and mothers born abroad in School 1, whereas less than 9% and 5% of parents were born abroad for students in Schools 2 and 3. As data in this study came from self- and peer reports (except for sex and date of birth, which was provided by the school), we relied on proxies for socio-economic status (SES) that we expected our respondents to provide reliable information on: type of house the respondent lives in and family holiday frequency. Some variation was noticeable on these traits, with respondents from School 1 showing the lowest SES. In School 1, 59% of respondents lived in a (semi-)detached house, versus 81% in Schools 2 and 3. Furthermore, 61% of respondents in School 1 enjoyed a family holiday at least annually, versus 77% and 69% of respondents in Schools 2 and 3.

Two waves of data were collected. The first wave was collected in November 2014, the second in March and April 2015. Questionnaires were filled in by paper and pencil, within one school hour. Three of the authors were responsible for the data collection. The data were anonymized before the analyses, and questionnaires were completed on a voluntary basis. Schools sent information about the study and permission forms to parents. Parents who did not want their child to participate in the assessment were asked to return the form. Students were informed at school about the research and gave written consent. Both parents and students could withdraw from participation at any time. Students who did not receive parental consent, or who did not

want to participate themselves, or who were unable to fill in the questionnaire, did not participate.

Table 3.1. Sample description by school

	School 1 ($n = 756$)	School 2 ($n = 1011$)	School 3 ($n = 167$)
Age in years at wave 1 (11-20)	14.76 (1.32)	15.16 (1.76)	14.27(1.37)
Gender			
Boys	55.7%	42.5.%	52.1%
Girls	44.3%	57.5.%	47.9%
Sexual orientation			
Heterosexual	94.4%	93.5%	94.0%
Sexual minority	5.6%	6.5%	6.0%
Country of birth			
Netherlands	94.9%	97.3%	96.7%
Turkey	0.6%	0.3%	0.7%
Marocco	0.1%	0.0%	0.0%
Surinam	0.3%	0.2%	0.0%
Dutch Antilles	1.4%	0.2%	0.7%
Indonesia	0.0%	0.0%	0.0%
Other Western	0.7%	0.6%	0.7%
Other non-Western	2.0%	1.4%	1.3%
Country of birth father			
Netherlands	80.3%	91.1%	95.4%
Turkey	4.8%	1.9%	2.0%
Marocco	0.6%	0.2%	0.0%
Surinam	2.1%	1.2%	0.7%
Dutch Antilles	2.6%	0.2%	1.3%
Indonesia	1.1%	0.7%	0.0%
Other Western	2.7%	2.6%	0.7%
Other non-Western	5.8%	2.1%	0.0%
Country of birth mother			
Netherlands	84.1%	92.4%	95.4%
Turkey	4.5%	1.5%	0.7%
Marocco	0.9%	0.2%	0.7%
Surinam	1.1%	0.8%	0.0%
Dutch Antilles	2.0%	0.3%	1.3%
Indonesia	0.7%	0.3%	0.7%
Other Western	2.3%	2.7%	0.7%
Other non-Western	4.5%	1.7%	0.7%
SES: Type of house			
Detached	39.5%	55.3%	58.0%
Semi-detached	19.1%	26.0%	23.3%
Terraced	39.3%	17.4%	17.3%
Appartment	2.1%	1.3%	1.4%
SES: Family holiday frequency			
Seldom to never	11.4%	5.7%	11.3%
Not every year	27.3%	17.5%	19.3%
Once or several times per year	61.3%	76.8%	69.4%

Note. Valid % used. Percentages may not sum to 100 due to rounding. Missing fraction on categorical variables ranged between 0% (gender in Schools 1 and 3) and 8.4% (sexual orientation School 3).

Measures

Homophobic attitudes were measured using a scale consisting of eight Likert-type statements, which was developed for the purpose of this study. We selected the most straightforward items from existing scales on homophobic attitudes (Herek, 1988; Kuyper, 2015; van de Meerendonk, Eisinga, & Felling, 2003; van Wijk, van De Meerendonk, Bakker, & Vanwesenbeeck, 2005), thereby safeguarding comprehensibility by even our youngest respondents. The scales showed satisfactory levels of internal consistency (α = .92) and test-retest reliability as evident from a high intra-person correlation over time (r = .80). Furthermore, principal component analysis indicated that all items loaded strongly on one factor, with loadings ranging between .78 and .85. Scale items referred to attitudes towards homosexual men or homosexuality in general. Items included "I think it is disgusting when two men kiss"; "I'm getting tired of all the attention for homosexuals". Answering options ranged between *completely disagree* (1) and *completely agree* (5). Higher values on the scale indicated more homophobic attitudes. Considering the low age of some of our respondents, we made sure that the statements were formulated as straightforwardly as possible. An overview of the scale items can be found in Appendix A2. Respondents' development of homophobic attitudes was examined using the Simulation Investigation for Empirical Network Analysis (SIENA) software package in R (RSiena), version 1.2-3. As RSiena is not yet capable of modelling the evolution of continuous behavior variables (Ripley, Snijders, Boda, Vörös, & Preciado, 2018), the homophobic attitudes scale was split into eight categories, each one containing answers on a range of 0.5 points on the original scale.

Friendship and antipathy networks were constructed based on peer nominations for the questions "Who are your best friends?" and "Who do you not like?". For both questions, respondents could nominate up to 24 peers from the same school, resulting in school level networks.

Gender was used to control for friendship and antipathy formation based on gender homophily. Girls were coded as 0, and boys as 1.

Ethnicity. Because of the fairly homogenous ethnic composition of our sample, a dichotomous operationalization of ethnicity was used, contrasting ethnic majority with ethnic minority respondents. Respondents were considered to be of an ethnic minority background when either they or at least one of their parents was born in a non-Western country. Ethnic majority members were coded as 0, and ethnic minority members as 1. Ethnicity was used to control for friendship and antipathy formation based on ethnic homophily, as well as to control for the effect of ethnic minority status on the level and development of homophobic attitudes.

Sexual orientation was measured by combining information on self-identification and romantic attraction, hereby acknowledging the multifaceted nature of sexual orientation (Savin-Williams, 2006). The self-identification question was formulated as follows: "What do you think you are?" Answering options were *heterosexual, homosexual*, *bisexual*, *don't know*, and *no answer*. Romantic attraction was measured by asking respondents whether they had ever been in love with a boy (yes

or no) or a girl (yes or no). Sexual orientation was operationalized as a dichotomous variable, contrasting heterosexual with sexual minority respondents. Respondents were considered to be sexual minority when they either self-identified as lesbian, gay, or bisexual, or when they indicated to have been in love with someone of the same gender. Sexual orientation was used to control for the effect of sexual minority status on the level and development of homophobic attitudes.

Grade, class. In order to control for friendship and antipathy selection due to physical proximity, we included grade and class as control variables for friendship and antipathy formation.

Analytic strategy. Respondents' development of homophobic attitudes was examined using RSiena, which is a stochastic actor-based simulation model, developed for the analysis of longitudinal network data. The statistical procedure utilizes a large number of repeated simulations of the network evolution, which are used to estimate and test parameters, producing a probabilistic network evolution that could have brought the observed networks about (Ripley et al., 2018). Of specific utility for the goals of this study is that RSiena allows for the possibility of modelling networks and individual behavior (Snijders, Lomi, & Torló, 2013; Steglich, Snijders, & Pearson, 2010). While controlling for *structural network effects* (i.e., the structure of friendship and antipathy networks), RSiena estimates both *networks dynamics* (including selection processes) and *behavior dynamics* (including influence processes) longitudinally (Steglich et al., 2010).

The model parameters are explained in the following paragraph and are tested using *t*-ratios (parameter estimate divided by its standard error). We estimated RSiena models for each of the three schools, resulting in three models. Conclusions on our hypotheses were drawn on the basis of the combined results, using a Fisher-type test for combining independent *p*-values (Fisher, 1932). This method produces two one-sided tests: one with an alternative hypothesis that for at least one network the parameter estimate is smaller than zero, and one with an alternative hypothesis that for at least one network the parameter estimate is greater than zero. As two tests are conducted for each parameter, inference with regard to statistical significance was based on *p*-values of $\alpha/2$, with α set at .05.

Model specification. In order to test our hypotheses, we estimated integrated friendship-dislike-homophobic attitudes co-evolution models. Effects could be included in the model for three different reasons. Next to effects included for hypothesis testing (1) and effects included to control potential confounders (2), RSiena models require the inclusion of a set of variables for reasons of model convergence and goodness-of-fit with regard to auxiliary statistics (3) (Lospinoso, 2012; Ripley et al., 2018). A second important function of the effects included for reasons of convergence and fit, is that they control for endogenous network processes that could confound the selection and influence effects that we tested (Steglich et al., 2010). We calculated goodness-of-fit in

terms of geodesic and degree distributions of the friendship and antipathy network, and the distribution of homophobic attitudes. Fit indices are displayed in Appendix A2. The final model specification included the following hypothesis testing, control, and model convergence/goodness of fit/endogenous network processes effects:

Hypothesis testing effects. By estimating the *homophobic attitudes similarity* effect in both the friendship and antipathy dynamics part of the network, we tested whether friendships (H3) or antipathies (H4) tend to occur more often between individuals with similar or dissimilar homophobic attitudes respectively. Such similarity effects are typically estimated and interpreted in combination with ego (given nominations) and alter (received nominations) effects. These *homophobic attitudes ego* and *homophobic attitudes alter* effects show whether more homophobic respondents give and/or receive more nominations as friend and antipathy. By estimating an *average similarity effect* for both friendships and antipathies in the homophobic attitudes dynamics part of the model, we tested whether or not respondents were likely to assimilate with their friends in terms of homophobic attitudes (H1) or become more dissimilar to their antipathies in terms of homophobic attitudes (H2).

Control effects. Ego, alter, and similarity effects for gender were included in both the friendship and antipathy dynamics parts of the model to control for network selection based on gender. In the friendship network we additionally included ego, alter, and similarity effects for ethnicity. In the antipathy dynamics part of the model only the similarity effect was included, as ego and alter effects led to convergence problems. In addition, same school grade and school class effects were included in order to control for friendship selection due to physical proximity within the school context. Only the grade effect was included in the antipathy dynamics part of the network, as the school class effect was not significant and led to convergence issues in one of the networks. Furthermore, direct effects of *gender, ethnicity, and same-sex attraction* on homophobic attitudes were estimated in order to control for the effect of gender, ethnic minority status, and sexual minority status on the level and development of homophobic attitudes. Please note that we did not control for sexual orientation in the friendship and antipathy dynamics part of the model as this led to problems with regard to model convergence, probably due to the low proportion of sexual minority respondents in our sample.

Model convergence and goodness-of-fit effects. Rate parameters, outdegree(density), and reciprocity effects were by default included in both the friendship and antipathy dynamics part of the model. Rate parameters refer to the rate of change in network ties between time points. *Outdegree (density)* reflects the tendency of individuals to nominate others. Reciprocity reflects the tendency to reciprocate received nominations.

Two effects were included in the friendship dynamics part of the model only. Three-cycles represent cycles of generalized reciprocity (i.e., student A nominates student B, student B nominates student C, and student C nominates student A). Furthermore, including the *geometrically weighted edgewise shared partners "Forward-*

Forward" (gwespFF) effect, which represents an alternative expression for transitivity, proved beneficial for model fit.

Consistent with recent recommendations (Ripley et al., 2018), the i*ndegree popularity, outdegree popularity, and outdegree activity* effects were included in the friendship dynamics part of the network. *Indegree popularity* reflects tendencies for actors with high indegrees (i.e., receiving friendship or antipathy nominations) to attract extra incoming ties 'because' of their high current indegrees. *Outdegree popularity* reflects tendencies for individuals with high outdegrees (i.e., sending friendship or antipathy nominations) to receive extra incoming ties. *Outdegree activity* refers to the tendency for actors with high outdegrees to send out extra outgoing ties due to their high current outdegrees.

We used slightly different effects in the antipathy dynamics part of the network for reasons of model fit (see also Appendix A2). In addition to the *indegree popularity* and *outdegree activity* effects, we included the *outdegree truncation* effect. This effect reflects the tendency of individuals to send no antipathy ties. Furthermore, the transitive triplets effects was included in the antipathy dynamics part of the network. It reflects a tendency for network closure through transitivity.

In addition, we included two cross-network effects, where antipathy dynamics were modelled dependent on some characteristics of the friendship network. As the antipathy relationships were comparatively less stable than the friendship relationships, the inclusion of these effects likely was beneficial for the convergence and reliability of estimates of the antipathy dynamics (Snijders et al., 2013). *Friendship outdegree (sqrt) to antipathy activity* represents the extent to which actors with high friendship outdegrees will make more choices in the antipathy network. *Friendship to agreement* reflected the tendency for actors who are friends to have outgoing antipathy ties to the same actors.

Lastly, three effects were by default included in the homophobic attitudes dynamics part of the model for reasons of model convergence. The *rate parameter* indicated the rate of change in respondents' homophobic attitudes between time points. The overall mean and variance of homophobic attitudes were controlled for by the *linear shape* (overall tendency) and *quadratic shape* (a negative parameter indicates regression to the mean, whereas a positive parameter indicates polarization) parameters.

3.4 Results

Descriptive statistics. Homophobic attitudes per school and wave are plotted in Figure 3.1. The distribution of attitudes was close to symmetrical in School 1 and somewhat skewed to the right in Schools 2 and 3. On average, respondents were somewhat less homophobic in Schools 2 and 3 than in School 1. Descriptive statistics for the friendship and antipathy network are provided in Table 3.2. On average, respondents

nominated between 5.34 (School 1) and 6.30 (School 3) best friends. For antipathies, respondents nominated on average between 2.13 (School 3) and 2.50 (School 1) of their peers. Please also note that 49% of friendship ties concerned respondents from different classrooms, and 15% of friendship ties concerned respondents from different grades. For antipathy ties, these percentages were 52 and 13 (all calculated using wave 1 data).

The Jaccard index for the friendship networks (.32 - .36) indicated sufficient stability in the friendship network. Stability in the antipathy network was lower (.13 - .18), as is typically seen in studies on antipathy networks in adolescence (e.g., Berger & Dijkstra, 2013). Although there was a fairly high intrapersonal correlation with regard to homophobic attitudes, variation was sufficiently high for modelling attitude dynamics over time: Only about 30% of respondents did not move to a different category on the homophobic attitudes scale between waves 1 and 2 (number of "actors that remain stable" in Table 3.2). The fraction of missing network data for wave 2 was relatively high in School 2 (28.3%), which was due to the fact that 211 students from exam classes in that school had finished classes by the time we collected data for wave 2. These respondents were consequently removed from the network for wave two, employing the method of composition change for longitudinal network analysis (Huisman & Snijders, 2003).
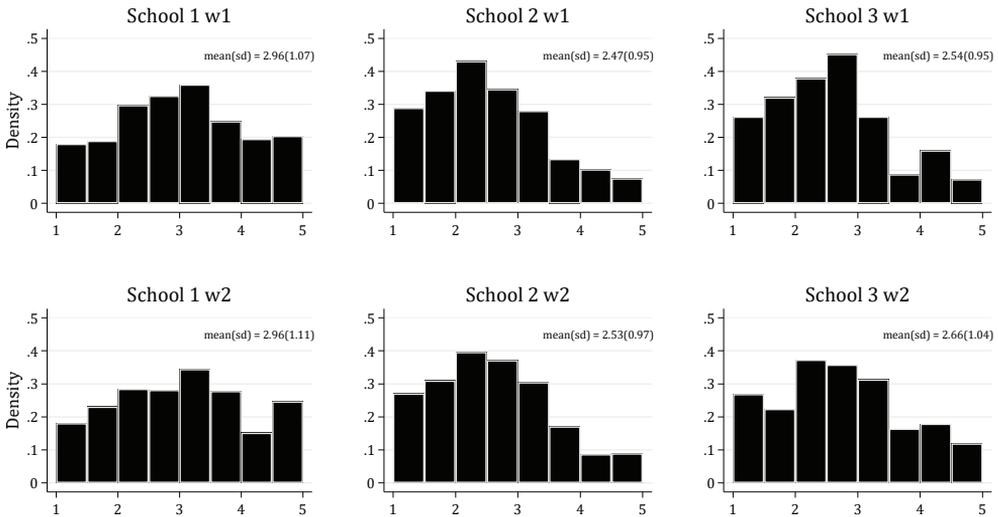

Figure 3.1. Homophobic attitudes per wave per school

Note: Higher scores reflect more homophobic attitudes.

Table 3.2. Sample and sample change descriptives for friendships, antipathies, and homophobic attitudes

	School 1 (n=756)				School 2 (n=1011)				School 3 (n=167)			
	Friendship		Antipathy		Friendship		Antipathy		Friendship		Antipathy	
Sample	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2
Network density indicators												
Network density	0.008	0.008	0.003	0.002	0.006	0.005	0.002	0.002	0.032	0.030	0.015	0.012
Average degree	6.296	5.765	2.126	1.860	5.855	4.754	2.335	1.894	5.342	5.015	2.497	1.921
Missing fraction	0.115	0.138	0.115	0.138	0.109	0.283	0.109	0.283	0.108	0.192	0.108	0.192
Other network indicators												
Reciprocity (edgewise)	0.423	0.423	0.096	0.060	0.497	0.505	0.107	0.127	0.490	0.510	0.174	0.167
Transitivity	0.258	0.281	0.082	0.080	0.337	0.334	0.078	0.116	0.368	0.369	0.185	0.149
Sample change	Wave 1-Wave 2		Wave 1-Wave 2		Wave 1-Wave 2		Wave 1-Wave 2		Wave 1-Wave 2		Wave 1-Wave 2	
Network changes												
Jaccard index (stability)	0.32		0.13		0.32		0.14		0.36		0.18	
No. of ties dissolved	2006		949		2196		1140		385		299	
No. of ties emerged	1701		827		1486		958		285		185	
No. of ties maintained	1718		262		1696		327		374		108	
Changes in homophobic attitude												
No. of steps down	232				194				50			
No. of steps up	281				305				66			
Actors that remain stable	229				285				47			

Notes: Standard deviations are placed between brackets.
Reciprocity was calculated as 2M/[2M+A], where M = mutual ties and A = asymmetric ties.
Transitivity was calculated as N of transitive triplets divided by N of 2-paths (potentially transitive triplets).
For more information on the calculation of the different network indices see Veenstra and Steglich (2012).

Table 3.3. Results complete RSiena models

| Effect | School 1 | | School 2 | | School 3 | | | |
	par.	(s.e.)	par.	(s.e.)	par.	(s.e.)	Fisher <0	Fisher >0
Friendship dynamics:								
basic rate parameter friendship	22.57	(0.75)	27.53	(1.19)	11.04	(0.96)	1.000	< 0.001
outdegree (density)	-3.79***	(0.07)	-3.41***	(0.09)	-3.25***	(0.27)	< 0.001	1.000
reciprocity	1.83***	(0.07)	2.27***	(0.08)	1.69***	(0.19)	1.000	< 0.001
3-cycles	-0.18***	(0.03)	-0.23***	(0.03)	-0.21*	(0.08)	<0.001	1.000
gwespFF (.69)	1.63***	(0.04)	1.80***	(0.05)	1.53***	(0.15)	1.000	< 0.001
indegree – popularity	-0.02***	(0.01)	-0.03***	(0.01)	-0.04‡	(0.03)	<0.001	1.000
outdegree-popularity	-0.05***	(0.01)	-0.08***	(0.01)	-0.05*	(0.02)	<0.001	1.000
outdegree-activity	0.01***	(0.00)	-0.00	(0.00)	-0.01	(0.01)	0.237	0.005
gender alter	-0.09*	(0.04)	-0.22***	(0.05)	0.27*	(0.13)	<0.001	0.257
gender ego	0.17***	(0.05)	-0.01	(0.05)	0.25‡	(0.13)	0.945	<0.001
same gender	0.31***	(0.04)	0.35***	(0.04)	0.65***	(0.11)	1.000	<0.001
same grade	0.64***	(0.04)	0.64***	(0.04)	0.50***	(0.12)	1.000	< 0.001
same class	0.73***	(0.04)	0.40***	(0.04)	0.58***	(0.11)	1.000	< 0.001
gender alter	0.27***	(0.04)	0.20***	(0.06)	0.04	(0.27)	0.977	<0.001
ethnicity ego	0.23***	(0.04)	0.17**	(0.07)	-0.91‡	(0.47)	0.293	<0.001
same ethnicity	0.32***	(0.04)	0.14*	(0.06)	0.05	(0.21)	0.982	<0.001
homophobic attitudes alter	0.00	(0.01)	-0.04*	(0.01)	0.03	(0.04)	0.059	0.560
homophobic attitudes ego	0.02	(0.01)	-0.02	(0.02)	0.04	(0.03)	0.547	0.171
homophobic attitudes similarity	-0.09	(0.10)	0.02	(0.14)	-1.18***	(0.35)	0.003	0.908
Antipathy dynamics:								
basic rate parameter dislike	19.34	(0.90)	22.99	(1.33)	16.82	(1.73)	1.000	< 0.001
outdegree (density)	-4.42***	(0.14)	-4.60***	(0.33)	-4.11***	(0.25)	< 0.001	1.000
reciprocity	0.73***	(0.17)	1.07***	(0.11)	0.90***	(0.18)	1.000	< 0.001
transitive triplets	0.25***	(0.08)	0.23	(0.18)	-0.06	(0.07)	0.755	0.002
indegree - popularity	0.05‡	(0.03)	0.03	(0.06)	0.07***	(0.02)	0.993	< 0.001
outdegree-activity	0.02***	(0.00)	0.02***	(0.00)	0.05***	(0.01)	1.000	< 0.001
outdegree-trunc (1)	-3.10***	(0.19)	-2.77***	(0.21)	-2.73***	(0.38)	< 0.001	1.000
gender alter	0.05	(0.05)	-0.02	(0.10)	0.01	(0.11)	0.772	0.387
gender ego	0.05	(0.05)	-0.04	(0.06)	0.03	(0.11)	0.639	0.413
same gender	0.31***	(0.04)	0.13**	(0.04)	-0.10	(0.10)	0.693	< 0.001
same grade	1.57***	(0.07)	2.04***	(0.09)	1.63***	(0.15)	1.000	< 0.001
same ethnicity	0.03	(0.04)	-0.09‡	(0.05)	0.29*	(0.13)	0.264	0.079
homophobic attitudes alter	-0.01	(0.02)	0.04	(0.03)	0.00	(0.04)	0.683	0.364
homophobic attitudes ego	0.02	(0.01)	-0.03*	(0.01)	-0.02	(0.03)	0.095	0.408
homophobic attitudes similarity	0.07	(0.13)	-0.03	(0.16)	-0.37	(0.29)	0.324	0.718
outdeg.^(1/2) friendship activity	-0.10***	(0.03)	-0.13**	(0.04)	-0.29**	(0.09)	< 0.001	1.000
friendship to agreement	0.64***	(0.14)	0.76***	(0.19)	0.30**	(0.09)	1.000	< 0.001
Homphobic attitudes dynamics								
rate homophobic attitudes period 1	2.64	(0.25)	2.61	(0.20)	2.90	(0.49)	1.000	<0.001
linear shape	0.06	(0.05)	0.04	(0.04)	-0.12	(0.11)	0.558	0.271
quadratic shape	-0.04	(0.06)	0.01	(0.06)	0.09	(0.09)	0.639	0.440
average similarity (friendship)	4.10*	(1.73)	2.35‡	(1.32)	5.89*	(2.70)	1.000	<0.001
average similarity (antipathy)	-7.84*	(3.91)	0.03	(4.09)	-0.64	(4.64)	0.102	0.855
Effect from gender	-0.29	(0.18)	-0.22‡	(0.12)	-0.16	(0.22)	0.018	0.994
Effect from ethnicity	-0.11	(0.12)	0.08	(0.11)	-1.70	(1.15)	0.162	0.760
Effect from ssa	-0.35‡	(0.21)	-0.19	(0.17)	-0.61	(0.52)	0.024	0.996

*Note. ‡p<0.10; * p<0.05; ** p<0.01, two-sided.*
All convergence t-ratios<0.08, overall maximum convergence ratio models all smaller than 0.21.
Extra lines around hypothesis testing effects.

RSiena results. Results of our RSiena models are depicted in Table 3.3. The model specifications showed adequate to good fit (Appendix A2). The Fisher-type combined test indicated that at least one of the average similarity effects was positive ($p < .001$), whilst there was no evidence pointing to negative similarity effects ($p \approx 1$). Looking at the parameter estimates of the individual networks, we see that all effects were positive, with two of the t-ratios of estimates for individual schools being statistically significant two-sidedly at $\alpha = .05$. Results were thus in line with our first hypothesis.

No clear patterns in homophobic attitudes alter or ego effects were found in the friendship dynamics part of the network, indicating that homophobic attitudes neither affected being nominated by others as a friend, nor to nominate others as friends. In addition, the Fisher-type combined test indicated that there was no evidence suggesting that at least one of the homophobic attitudes similarity effects was positive ($p = .91$) (H3). If anything, the Fisher-type test pointed to at least one negative effect ($p = .003$). Looking at the parameter estimates of the individual effects, it appears that this test result was driven by the results in School 3, where a significantly negative homophobic attitudes similarity estimate was found. In the other two schools, non-significant parameter estimates were found, of which one was positive and the other negative.

In order to better understand this unexpected negative effect, we conducted a series of exploratory supplementary analyses, testing interaction effects between the negative homophobic similarity effects and a range of ego and dyadic effects, in order to find out whether this unexpected effect was largely driven by subgroups of respondents in that school. Effects tested included ego and dyadic effects for gender, age, grade, ethnicity, and popularity. None of these interactions were statistically significant, nor did they lead to a substantial change in the size, direction, or significance of the homophobic attitudes similarity effect.

No statistically significant evidence was found for either a negative ($p = .10$) or a positive ($p = .86$) average similarity of antipathies effect in the attitude dynamics part of the model, finding no evidence for respondents becoming more dissimilar or similar in homophobic attitudes compared to their antipathies (H2). However, when looking at the individual schools, we see that a negative effect was observed in School 1, statistically significant at $\alpha = .05$. No evidence was found for either negative ($p = .32$) or positive ($p = .72$) homophobic attitudes similarity effects in the antipathy dynamics part of the network. We did thus not find that dissimilarity or similarity in homophobic attitudes increased the chance of respondents establishing or maintaining an antipathy tie (H4).

Supplementary analyses. It is feasible that the strength of influence and selection processes differed substantially between school grades, given the considerable age range of our respondents and the variation in salience of homophobic attitudes over the course of adolescence reported in earlier research (Horn, 2006). Therefore, we additionally checked whether systematic between-grade differences existed with

regard to our hypothesis-testing effects by conducting score-type tests (Ripley et al., 2018; Schweinberger, 2012). Interaction effects between dummies for grades and the selection and influence effects were added to the model, constrained at zero. After estimation, large misfit between the data under the restricted model (assuming no differences in selection and influence effects between grades) and the observed data (allowing for differences in these tendencies between grades) would result in large test statistics, suggesting that not restricting (some of the) parameters results in improved model fit. We detected no systematic differences between grades with regard to our hypothesis testing effects (results available from the first author). Similarly, some of the literature summarized in the introduction suggested that homophobic attitudes may be a more salient topic amongst boys than amongst girls (e.g., McCann et al., 2009; Plummer, 2001; Slaatten et al., 2014). Consequently, we investigated whether selection and influence processes were stronger for boys than for girls, also by conducting score-type tests. We detected no systematic differences between boys and girls with regard to our hypothesis testing effects (results available from the first author).

3.5 Discussion

The goal of this study was to better understand homophobic attitudes, which have been recognized as a problematic component of adolescent development (Horn, 2006; McCann et al., 2009). We analyzed the social salience of homophobic attitudes in adolescence by employing longitudinal social network models and examining the potential influence of both friends and antipathies. Furthermore, we studied whether homophobic attitudes served as a selection criterion for both friendships and antipathies. Results indicated that friends influence each other with regard to homophobic attitudes. We did however not find that friends selected each other based on similarity on this topic. Moreover, we did not find that antipathies distanced themselves from each other in terms of homophobic attitudes, nor that adolescents started or continued to dislike peers based on dissimilarity in homophobic attitudes.

Results from this study were in line with earlier studies claiming that peers influence each other's homophobic attitudes (Poteat et al., 2007, 2015; Prati, 2012; Slaatten, Hetland, et al., 2015). This study adds to the literature by extending this finding within a framework with extra methodological rigor. In addition to finding that adolescents' homophobic attitudes are correlated with those of their friends, we discovered that adolescents grow closer to the attitudes of their friends over time. Whilst doing so, we controlled for selection as a potential mechanism for similarity in homophobic attitudes between friends, as well as a large number of endogenous network effects that could have confounded social influence.

We did not find evidence for adolescents being more likely to select each other as friends when they were more similar in homophobic attitudes. This could mean that homophobic attitudes might not operate as a selection criterion for friendship selection

in adolescence. Stronger selection effects might have been detected when more visible aspects of homophobic prejudice than attitudes would have been measured, such as homophobic bullying or name-calling. Yet, it has been found that adolescents do not only display homophobic behavior in order to express homophobic attitudes, but also more instrumentally, for instance to acquire social status or as a bullying strategy (Fulcher, 2017; Poteat & DiGiovanni, 2010). Hence, whilst our choice for homophobic attitudes instead of homophobic behavior might have led to missing possibly present selection mechanisms on this topic, this choice at the same time meant that we studied an attribute that is more closely linked to the concept of homophobia.

In addition, results in one of our schools pointed to a negative effect of similarity in homophobic attitudes on friendship selection. This means that adolescents were less likely to establish or maintain a friendship tie with others the more similar they were in homophobic attitudes. Although this pattern was found in only one school (School 3), this result provides room for speculation. As School 3 was by far the smallest school in our study, the negative selection effect found there could for instance suggest that under structural constraints one might be more likely to accept that friends hold different opinions.

We only found limited evidence to suggest that antipathies grew more dissimilar in homophobic attitudes over time. Hereby, our study adds to a small yet growing body of research that fails to find convincing empirical evidence for negative influence as a mechanism of social influence (for an overview see Flache et al., 2017; Takács et al., 2016). Moreover, previous research has tried to detect negative social influence by means of experiments. To our knowledge this is the first field study focusing on negative influence, examining attitude dynamics over a longer period of time, making our outcomes a potentially valuable note for those working in the field of opinion dynamics. This being said, a statistically significant negative influence of antipathies on homophobic attitudes was found in School 1. It could be that the lack of effects in the other two schools is a consequence of the relatively high number of changes in antipathy relationships in our sample, which is typical for such types of networks (e.g., Berger and Dijkstra 2013). At the same time, one might question whether this instability represents measurement error, which makes it hard to observe the negative social influence that is taking place, or comprises a valid part of empirical reality. If the latter is true, this could mean that antipathy relationships lack the stability and salience to exert social influence, at least with regard to homophobic attitudes.

In addition, we expected disliking to be a sufficient condition for eliciting negative social influence on homophobic attitudes, given the prominence of these attitudes in the adolescent peer context (e.g., Collier, Bos, et al., 2013; Slaatten, Anderssen, & Hetland, 2015). The results of this study could imply that disliking alone is not enough to spark negative influence. For instance, some theoretical models on opinion formation have argued that negative influence between antipathies might be particularly likely if antipathies have very different opinions to begin with (Flache & Macy, 2011). Furthermore, borrowing arguments from faultline theory (Thatcher &

Patel, 2011), it could be contended that negative influence occurs only when antipathies also differ on relevant demographic traits, such as gender or ethnicity, such that more strictly delineated and thereby more socially salient social groups emerge. These hypotheses imply interactions between negative influence between antipathies and homophobic attitude differences between these antipathies at the start of the study period, or interactions between negative influence between antipathies and the race or gender of adolescents and the peers they dislike. Modelling such interactions is however not straightforward within the employed analytic framework. Therefore, we leave tackling these matters to future research.

      This study was not without limitations. Although we operationalized homophobic attitudes such that they discriminated well between respondents and showed satisfactory psychometric properties, our measure only included items referring to gay men or homosexuality in general. Items specifically referring to lesbian women were not included. This is common in the field, where more instruments for the measurement of homophobic attitudes have been developed that include no or only a few items explicitly referring to lesbian women (Siebert, Chonody, Rutledge, & Killian, 2009; van Wijk et al., 2005; Wright, Adams, & Bemat, 1999). Nonetheless, this choice could have influenced our results. For instance, research tends to find that attitudes are more negative towards gay men than towards lesbian women (Herek, 1988; Hinrichs & Rosenberg, 2002; Swank & Raiz, 2010), and that gay men more often are victim to discrimination than lesbian women (Katz-Wise & Hyde, 2012). Furthermore, in the adolescent context, homophobic attitudes were predominantly associated with the victimization of gay male targets (Prati, 2012). It could thus be that we would have found smaller effects had we measured attitudes towards lesbian women or had we included items with regard to lesbian women in our scale.

      A second limitation was that we were only able to control for the effect of respondents' own sexual orientation on their level and change of homophobic attitudes over time. Due to problems with model convergence, we could not control for the effects of sexual orientation on friendship or antipathy dynamics. Although this is certainly a restriction of this study, the extent to which it affected our conclusions may be limited. Only six percent of respondents were coded to have a sexual minority orientation, whereas homophobic attitudes varied substantially throughout the whole sample. As such, the sexual orientation of respondents might have confounded network dynamics driven by attitudes towards homosexuality to only a limited extent. In addition, we only had information on the sexual orientation of respondents, not on whether or not they were out at school. This could have restricted the effect of controlling for having sexual minority friends (antipathies) on homophobic attitudes dynamics or the effect of knowing sexual minority peers on relationship dynamics, which may only impact the level of homophobic attitudes or relationship choice of adolescents in case they are aware of the sexual minority orientation of these peers.

A last limitation of this study was the relatively high amount of missing data at wave 2 in School 2, due to the unavailability of exam classes in that school at that wave. We dealt with this by informing our RSiena model of the departure of a number of respondents from the network, yet it remains a liability nonetheless. However, please note that our conclusions would not have changed in case we would have disregarded the results of School 2: The results of Fisher-type tests using Schools 1 and 3 only (available from the first author) would have led to the same statistical inferences as the ones reported above.

In conclusion, results from this study allude to the social salience of homophobic attitudes in adolescence. Respondents were found to assimilate with the homophobic attitudes of their friends over time. Furthermore, findings from this study add to the growing body of literature that questions the existence of negative social influence. In addition, we did not find positive selection, suggesting that friendship bonds will not be broken over dissimilar levels of homophobic attitudes. A combination of these findings suggests that although a homophobic peer climate can spread through friendship networks, tolerant attitudes with regard to sexual diversity can spread in the same way.