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Abstract

Introduction. Traditional (offline) bullying and cyberbullying involvement are associated with severe psychosocial problems. Non-heterosexual (LGBQ) youth are more often victimized by traditional bullying than heterosexual (non-LGBQ) youth, but little research is available on LGBQ youth's cyberbullying victimization and perpetration rates. Moreover, rates may differ by youth's age and gender, and victimization may be higher for sexual forms of cyberbullying. **Method.** A cross-sectional, school-based survey was conducted among 1037 adolescents aged 12-18 years. Traditional and cyberbullying involvement were measured using validated single items for each type of involvement (victimization, perpetration), and complemented with items on specific types of cyberbullying victimization (by messaging and posts; by sexual images; by personally embarrassing images). Sexual orientation was determined based on sexual attraction. Logistic regression analyses were conducted, corrected for age and gender. **Results.** LGBQ youth were more often victimized by traditional victimization than non-LGBQ youth and more often perpetrator of cyberbullying. No gender differences were found, and no increased rates of traditional bullying perpetration were noted once interaction effects with age and gender were taken into account. A significant interaction effect was found with age for traditional victimization, cyberbullying victimization, and cyberbullying victimization by messaging/posts and by sexual images: these prevalence rates were higher among older LGBQ youth but decreased or remained stable among non-LGBQ youth with age. **Conclusion.** This study highlights the need for tailored prevention and intervention programs specific for LGBQ youth in late adolescence, whereas most current programs are targeted at early adolescence when there is a peak in victimization for the general population.

Keywords: sexual orientation, lesbian, gay, bisexual, non-heterosexual, bullying, cyberbullying, adolescent

1. Introduction

Bullying is an intentional act to hurt, socially isolate or cause distress to a victim, that happens repeatedly or results in repeated harm, and that involves a power imbalance between perpetrator and victim (Olweus, 1997). In traditional bullying that occurs offline, respectively 35-36% of adolescents were involved as a victim or perpetrator (Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014). Cyberbullying is performed using electronic or digital media (Kiriakidis & Kavoura, 2010; Tokunaga, 2010), and around 15%-16% of adolescents were involved respectively as victim or perpetrator (Modecki et al., 2014). Traditional bullying and cyberbullying share common elements such as the intentionality to hurt, repetition and power imbalance. Not surprisingly, perpetration (r=0.47) and victimization (r=0.40) from these forms of bullying were significantly correlated (Modecki et al., 2014). Specificities of cyberbullying compared to traditional bullying, however, stem from social media's affordances of connectivity, visibility, social feedback, persistence and accessibility (Fox & Moreland, 2015). These affordances imply that those involved in cyberbullying have fewer visual or social cues to judge a situation; it gives them the chance to remain anonymous and reach a large audience; and it enables a sustained visibility of the cyberbullying content. Both traditional bullying and cyberbullying showed a peak in prevalence among 12-15 year olds (Kowalski, Giumetti, Schroeder, & Lattaner, 2014; Tokunaga, 2010). Traditional bullying victimization and perpetration and cyberbullying victimization and perpetration were associated with diverse psychosocial, physical and mental health problems, including stress, depression, anxiety, suicidal ideation, loneliness, substance abuse, reduced life satisfaction, reduced self-esteem, somatic problems and lower academic achievement (Gunther, DeSmet, Jacobs, & De Bourdeaudhuij, 2015; Kowalski et al., 2014). Cyberbullying involvement was less prevalent than traditional bullying, but may have a stronger psychosocial impact on those involved than traditional bullying (Campbell, Spears, Slee, Butler, & Kift, 2012; Schneider, O'Donnell, Stueve, & Coulter, 2012; Sourander, 2010).

Current research is scant on a group of adolescents who may be a higher risk for bullying involvement, namely youth with a non-heterosexual orientation. Emerging evidence showed that non-heterosexual youth were at higher risk for being cyberbullied (Hinduja & Patchin, 2011; Llorent, Ortega-Ruiz, & Zych, 2016; Priebe & Svedin, 2012; Schneider et al., 2012; Wiederhold, 2014), and for being victimized by traditional bullying (Birkett, Espelage, & Koenig, 2009; Schneider et al., 2012; Toomey & Russell, 2016; Wensley & Campbell, 2012). While some research showed that lesbian, gay, bisexual, and questioning (LGBQ) and transgendered youth were also more often perpetrators of cyberbullying than non-LGBQ/transgendered adolescents (Hinduja & Patchin, 2011; Llorent et al., 2016), other studies, however, found no difference in cyberbullying perpetration by sexual orientation (Wensley & Campbell, 2012). Some research moreover suggested that differences in bullying involvement by youth's sexual orientation may depend on adolescents' gender and age, or the specific type of bullying. A study by Wensley and Campbell (2012) showed elevated rates of traditional

bullying victimization among LGBQ and transgendered youth compared to heterosexual youth, but only found such higher rates for cyberbullying victimization among male youth. This gender difference was supported by qualitative reports of boys being more often cyberbullied for 'looking gay' whereas girls were more often cyberbullied for weight issues (Berne, Frisén, & Kling, 2014). LGBQ youth may be especially at risk for cyberbullying that has a sexual connotation (e.g. showing nudity, sexual gestures or making sexual comments). Online sexual harassment more often occurred among LGBQ/transgendered youth, and more specifically among girls (Mitchell, Ybarra, & Korchmaros, 2014). Sharing sexual images could lead to outing LGBQ youth's sexual identity and lead to supplementary forms of bullying or cyberbullying (Albury & Byron, 2014). Moreover, it is plausible to also expect an age difference in the prevalence of bullying and cyberbullying, since victimization of LGBQ youth increased after disclosure, and disclosure typically occurs in later adolescence (D'Augelli, Pilkington, & Hershberger, 2002). This may particularly be the case for cyberbullying with a sexual connotation. To our knowledge, no research on this topic yet exists. It may therefore be warranted to study different types of cyberbullying victimization when investigating differences by sexual orientation.

This study aimed to contribute to the scarce literature on the association between sexual orientation and bullying and cyberbullying involvement by (a) simultaneously addressing perpetration and victimization; and (b) examining not only overall cyberbullying involvement but also specific forms of cyberbullying (e.g. cyberbullying of sexual nature), and (c) investigating the role of gender and age. The following research questions (RQ) were addressed: 1) do youngsters who self-identify as LGBQ experience higher odds of victimization and perpetration of traditional bullying and of cyberbullying, than youth who self-identify as heterosexual?; 2) do these odds differ by type of cyberbullying; and 3) do these odds differ between boys and girls or by adolescents' age? We hypothesized that traditional and cyberbullying victimization would occur more often among LGBQ youth than among heterosexual youth (H1); that male LGBQ youth would be more often victimized by traditional bullying or cyberbullying than female LGBQ youth (H2); and that female (H3) and older (H4) LGBQ youth would experience more cybervictimization of sexual nature than male or younger LGBQ youth.

Given the psychosocial harm of traditional bullying and cyberbullying among LGBQ youth (Collier, van Beusekom, Bos, & Sandfort, 2013; Duong & Bradshaw, 2014), that may add to psychosocial problems already experienced at a higher rate by LGBQ youth than by non-LGBQ youth (Almeida, Johnson, Corliss, Molnar, & Azrael, 2009; Mustanski, Garofalo, & Emerson, 2010; Priebe & Svedin, 2012; Rivers & Noret, 2008; Shearer et al., 2016), these research findings are important to give direction to bullying and cyberbullying prevention programs for LGBQ youth.

2. Material and methods

2.1. Participants and design

A random sample of secondary schools was drawn from a government database of secondary education schools. Eight schools participated (31%). The main reason for not participating was lack of time. Within each school, classes were randomly selected. We aimed to collect data among all grades 7-12 (aged 12-18), which was not always practically feasible. Data collection took place at school, during one class hour. The anonymous paper-and-pencil survey was administered by the researchers, who explained at the start of the survey that students were under no obligation to participate and could withdraw at any time. Students were assured that their responses would be confidential and that no information would be shared with teachers, parents, or fellow students. Five students declined to participate, none of the parents declined consent. The study received approval from the Ethics Committee of the [identifying info omitted] University Hospital.

2.2. Measurements

2.2.1. Socio-demographic information

Socio-demographic variables included age, gender, type of education, country of birth, and family situation. These demographic variables were derived from the questionnaire of the Health Behavior in School-Aged Children (HBSC). This part also comprised a validated self-report scale for adolescents 'Family Affluence Scale' (FAS), to measure family wealth and socio-economic status (Boyce, Torsheim, Currie, & Zambon, 2006). The FAS is a summative scale consisting of four items (i.c. own bedroom, number of holidays per year, number of cars and computers owned). The summed index ranges from 0-9, with the following internationally used cut-off points: low FAS=score of 0-2; medium FAS=score of 3-5; high FAS=score of 6-9.

2.2.2. Sexual orientation

Sexual orientation was measured by one question assessing sexual attraction (Toomey & Russell, 2016), i.e. 'Who do you mostly fall in love with'?. The question had four answering categories: 'girls', 'boys', 'both girls or boys' or 'I am not sure'. Sexual orientation was determined in combination with the gender of each participant. Transgendered youth, which refers to gender identity rather than sexual orientation, was not considered an aspect of sexual orientation and is not comprised in this definition of sexual orientation (Gates, 2011). Gender identity was not questioned separately in this survey and transgendered youth are thus not identified here as a specific subgroup.

2.2.3. Bullying involvement

Questions on bullying and cyberbullying involvement were preceded by a definition of bullying based on Solberg & Olweus (2003), distinguishing it from unintentional acts or arguments between children of equal power, and were rated on a frequency scale reflecting involvement in the past six months, as used in the Olweus Bully/Victim questionnaire (Solberg & Olweus, 2003). The scale ranged from 'not

been bullied/bullied others', 'only once or twice', '2-3 times per month', 'about once a week' to 'several times a week' in the past six months. Questions for traditional bullying or cyberbullying involvement included experiences as a victim and perpetrator (single-item scales, 1 item each), and were rated on a 5-point Likert scale.

In addition, a list of 11 specific types of cyberbullying victimization was used, inspired by a validated cyberbullying questionnaire (Menesini, Nocentini, & Calussi, 2011), that varied cyberbullying in type (messages or posts, virus, embarrassing personal graphic material such as videos or pictures, graphic material such as videos or pictures of sexual or intimate nature, social exclusion), degree of visibility (sent privately or visible to others) and medium (text message such as SMS or email, post on social networking sites). These items were used in addition to the abovementioned single item on cyberbullying victimization since prompting with specific examples of cyberbullying has shown to result in higher prevalence rates (Gradinger, Strohmeier, & Spiel, 2010). Questions were rated on a 5-point Likert scale. These items were subjected to factor analysis (Varimax rotation), yielding 3 factors (R^2=63.6%): 1) messages and posts (α=0.81, 6 items, e.g. 'hurtful things were sent to me such as insults, mean comments, threats, on Facebook or other websites that were visible to others'); 2) by sexual images (α=0.87, 2 items, e.g. 'Photos or films of sexual or intimate (e.g. nude) nature were sent (forwarded) to others via SMS or email'); 3) by personally embarrassing images (α=0.77, 2 items, e.g. 'Embarrassing photos or films about me were sent (forwarded) to others via SMS or email'). The third factor differed from the second one, in that embarrassing material could be of non-sexual nature (e.g. weird facial expression, falling over something). One item (e.g. virus) loaded on several factors and was excluded. Given the skewed distribution, bullying involvement was dichotomized into 'at least once in the past 6 months' and 'never in the past 6 months' when used as a dependent variable.

In sum, cyberbullying victimization was measured by a single-item ('cyberbullying victimization-single item'), and by a multi-item scale that contained three factors: cyberbullying victimization by messaging and posts; cyberbullying victimization by sexual images; and cyberbullying victimization by personally embarrassing images.

2.3. Analyses

Since bullying involvement did not follow a normal distribution based on inspection of histograms, multiple binary logistic regression analyses were used to assess the direct association between sexual orientation and traditional bullying or cyberbullying involvement (RQ1), and the moderating role of age or gender in associations of sexual orientation with traditional bullying or cyberbullying involvement (RQ2).

Separate regression analyses were run for each form of bullying and cyberbullying involvement, each time including sexual orientation, age, gender, and their interactions as predictors. Collinearity diagnostics were conducted examining variance inflation factor (≤10) and tolerance (≥0.1). Cross-

tabulations were checked for empty combinations of cells or low expected frequencies (Field, 2014). Continuous independent variables were centered on the mean. All analyses were conducted using SPSS 22 software. Graphical presentations of moderator analyses were made using ModGraph v3 (Jose, 2013). Moderator graphs were based on parsimonious model results.

3. Results

3.1. Descriptive statistics

A total of 1062 adolescents took part. Twenty-five participants were removed from analyses due to non-discriminating answers on relevant diverse questions, or unreliable answers based on open-ended questions. The analysed sample consisted of 1037 adolescents (49.8% female, mean age 15.17 years). Means, standard deviations, and correlations between continuous variables are shown in Table 1.

Table 1. Descriptive statistics and correlations of the variables in the study (n=1037)

Variable (range)	M	SD	1	2	3	4	5	6	7
1. Age	15.17	1.86							
2. Traditional bullying victimization (0-4)	0.26	0.75	-0.07*						
3. Traditional bullying perpetration (0-4)	0.23	0.64	-0.00	0.23***					
4. Cyberbullying victimization (0-4)	0.11	0.47	-0.05	0.44***	0.21***				
5. Cyberbullying perpetration (0-4)	0.12	0.43	0.05	0.17***	0.51***	0.25***			
6. Cybervictimization by messaging/posts (1-5)	1.13	0.35	-0.06	0.47***	0.11***	0.60***	0.14***		
7. Cybervictimization by personally embarrassing material (1-5)	1.06	0.25	-0.02	0.23***	0.08*	0.20***	0.15***	0.38***	
8. Cybervictimization by sexual images (1-5)	1.02	0.18	0.07*	0.11***	0.10**	0.16***	0.15***	0.11**	0.23***

* p<0.05; ** p<.01; *** p<.001

The majority of the sample (82.4%) was of high family affluence, which is consistent with the high affluence rate in this region reported in the HBSC study (i.c. 72.7%; Buijs, T., personal communication). The majority (94.0%) was born in *<country info omitted>* and 70.3% only spoke *<language info omitted>* at home. Only 64.1% of the participants lived with their mother and father,

whereas one third lived in different family situations (e.g. co-parenthood, single-parent family, raised by grandparents, living in an institution). A non-heterosexual orientation was reported by 7.1% of the sample (0.8% lesbian, 1.2% gay, 1.6% bisexual, 3.5% questioning). Around 15-16% had been involved in traditional bullying (resp. victim, perpetrator) whereas around 8-9% had been involved in cyberbullying (single-item scale) (resp. victim, perpetrator). Table 2 shows prevalence rates and comparisons between LGBQ and non-LGBQ youth. There was a significantly higher prevalence for LGBQ youth to be a victim of traditional bullying, a perpetrator of cyberbullying, and a victim of cyberbullying by sexual images (note: 25% of cells expected count <5).

Table 2. Victimization and perpetration prevalence by sexual orientation

	All youth	Non-LGBQ	LGBQ	Difference between LGBQ and non-LGBQ
Traditional bullying victimization	14.9% *n=1000*	14.0% *n=930*	27.1% *n=70*	χ^2=8.90**
Traditional bullying perpetration	16.0% *n=1000*	16.1% *n=931*	14.5% *n=69*	χ^2=0.13
Cyberbullying victimization (single-item scale)	7.6% *n=999*	7.3% *n=930*	11.6% *n=69*	χ^2=1.68
Cyberbullying victimization by messaging and posts	26.8% *n=1003*	26.4% *n=934*	31.9% *n=69*	χ^2=0.97
Cyberbullying victimization by sexual images	2.1% *n=998*	1.8% *n=930*	5.9% *n=68*	χ^2=5.06*
Cyberbullying victimization by personally embarrassing images	7.2% *n=998*	7.0% *n=930*	10.3% *n=68*	χ^2=1.03
Cyberbullying perpetration (single-item scale)	9.1% *n=996*	8.6% *n=928*	16.2% *n=68*	χ^2=4.36*

3.2. Regression analyses

Collinearity diagnostics showed that all tolerance values were above 0.1 and VIF below 10, indicating no multi-collinearity among independent variables. Expected count was >1 for all cells in cross-tabulations. The contingency tables of 'cyberbullying by sexual images' with sexual orientation, and of 'cyberbullying by personally embarrassing images' with sexual orientation however showed 25% of cells with expected count below 5. Chi² results should be interpreted with caution here. Regression analyses with these combinations of variables were inspected for unreasonably large standard errors indicating invalid models, and effects with large standard errors were excluded from the analyses.

Full model information and parsimonious models are shown in Appendix (Tables A1-A2). Table 3 shows odds ratios for traditional bullying or cyberbullying involvement for youth of different sexual orientation, in a direct effect model and interaction effect model. When only considering the influence of age and gender, LGBQ youth showed significantly increased risks to be the victim of traditional bullying (OR=2.23), and to be a perpetrator of cyberbullying (OR=2.16). The model for cyberbullying by sexual images was not significant (see Appendix Table A1). When taking the influence of gender, age and interaction effects into account, LGBQ youth still showed significantly increased risks to be the victim of traditional bullying (OR=2.92), but odds of being a cyberbullying perpetrator were no longer significant. However, the interaction effects were also non-significant in the model for cyberbullying perpetration, and when assessing likelihood ratio tests, the model with the interaction effects with age ($\chi(1)$=0.058, p=0.81) or gender (($\chi(1)$=0.060, p=0.81) did not significantly increase the model fit. The model for cyberbullying perpetration without interaction effects with age and gender was therefore retained as parsimonious model. There were no significantly increased odds for being victimized by cyberbullying of any type, when taking the influence of age, gender and interaction effects into account. There were also no significantly increased odds for LGBQ youth to be involved as perpetrator of traditional bullying. These results provide partial confirmation for our first hypothesis, namely that LGBQ youth would be more involved in bullying than heterosexual youth: this hypothesis was only confirmed for traditional bullying victimization and cyberbullying perpetration, and not for cybervictimization or perpetration of traditional bullying when taking other factors such as age and gender, and interaction effects into account.

There was no significant interaction between sexual orientation and gender on any measure of bullying involvement, showing that, counter to expectations, boys of LGBQ orientation did not have increased risks compared to non-LGBQ peers. A second hypothesis, that male LGBQ youth would be more often victimized by traditional bullying or cyberbullying than female LGBQ youth, was thus not confirmed. Analyses for the significant interaction effect between sexual orientation and gender with cyberbullying by sexual images (H3) could not be assessed due to insufficient expected count per cell and high standard errors. In contrast to gender, participants' age did moderate some of the associations between sexual orientation and traditional bullying or cyberbullying involvement. The risk for youngsters with an LGBQ sexual orientation was higher depending on the youngster's age for traditional victimization, cyberbullying victimization (single-item scale), cyberbullying victimization by messages and posts, and cyberbullying victimization by sexual images, confirming our hypothesis (H4). As age increased, LGBQ youth were more likely to be at risk for these types of victimization, whereas these risks of victimization decreased or remained stable with age for non-LGBQ youth (Figure 1 as illustration, see Appendix Figures A1-A3 for other victimization types).
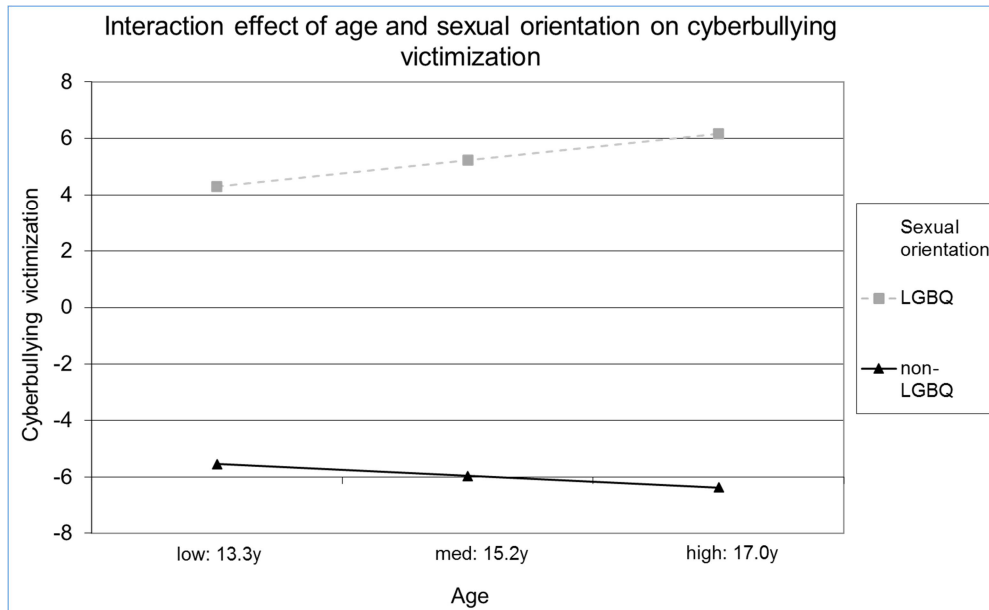
Fig. 1. Interaction effect of age and sexual orientation on cyberbullying victimization

Table 3. Odds ratios for traditional bullying or cyberbullying involvement by sexual orientation

	Traditional bullying victim	Traditional bullying perpetrator	Cyberbullying victim	Cyberbullying victim: messages/posts	Cyberbullying victim: sexual images	Cyberbullying victim: personally embarrassing images	Cyberbullying perpetrator
ADJUSTED ODDS RATIO (95% CI)							
Direct effects model (non-parsimonious model)							
Age	0.87 (0.78; 0.96)**	0.93 (0.85; 1.03)	0.88 (0.77; 1.00)°	0.94 (0.86; 1.02)	1.15 (0.91; 1.44)	0.98 (0.86; 1.12)	1.10 (0.98; 1.24)
Gender	1.33 (0.92; 1.91)	2.47 (1.70; 3.59)***	0.71 (0.44; 1.15)	0.51 (0.38; 0.68)***	1.20 (0.49; 2.90)	0.62 (0.37; 1.02)°	1.31 (0.83; 2.06)
Sexual orientation (ref. heterosexual)	2.23 (1.25; 3.99)**	0.83 (0.41; 1.69)	1.78 (0.81; 3.91)	1.52 (0.88; 2.62)	3.21 (1.04; 9.90)*	1.67 (0.73; 3.85)	2.16 (1.08; 4.33)*
Interaction effects model (non-parsimonious model)							
Age	0.81 (0.73; 0.91)***	0.92 (0.83; 1.02)	0.81 (0.69; 0.94)**	0.90 (0.83; 0.98)*	0.98 (0.76; 1.28)	0.96 (0.83; 1.11)	1.10 (0.97; 1.24)
Gender	1.41 (0.96; 2.09)°	2.57 (1.75; 3.78)***	0.74 (0.44; 1.24)	0.49 (0.36; 0.67)***	1.16 (0.47; 2.87)	0.65 (0.38; 1.10)	1.34 (0.82; 2.17)
Sexual orientation (ref. heterosexual)	2.92 (1.13; 7.52)*	1.29 (0.37; 4.49)	1.77 (0.52; 6.04)	1.10 (0.46; 2.63)	0.79 (0.08; 7.72)	2.01 (0.65; 6.25)	2.40 (0.77; 7.46)
Sexual orientation (ref. heterosexual) * gender (ref. girls)	0.59 (0.17; 1.99)	0.54 (0.12; 2.44)	0.55 (0.10; 3.07)	1.48 (0.47; 4.65)	NA	0.61 (0.11; 3.36)	0.84 (0.20; 3.50)
Sexual orientation (ref. heterosexual) * age	1.71 (1.23; 2.37)**	1.18 (0.82; 1.70)	2.16 (1.33; 3.51)**	1.58 (1.15; 2.17)**	2.74 (1.17; 6.44)*	1.26 (0.80; 2.01)	1.05 (0.71; 1.56)
Final model results (parsimonious model)							
Age	0.82 (0.73; 0.91)***	/	0.80 (0.69; 0.93)**	0.90 (0.83; 0.98)*	0.99 (0.76; 1.28)	/	/
Gender (ref. girls)	/	2.35 (1.65; 3.36)***	/	0.51 (0.38; 0.68)***	/	/	/

Sexual orientation (ref. heterosexual)	2.17 (1.18; 4.02)*	/	1.30 (0.49; 3.45)	1.37 (0.77; 2.45)	0.79 (0.08; 7.80)	/	==2.05 (1.03; 4.06)*==
Sexual orientation (ref. heterosexual) * age	1.69 (1.22; 2.34)**	/	2.05 (1.30; 3.24)**	1.61 (1.17. 2.21)**	2.76 (1.17; 6.48)*	/	/
Sexual orientation (ref. heterosexual) * gender (ref. girls)	/	/	/	/	/	/	/

NA: not available due to insufficient expected count or high standard errors. Analyses run without this interaction term

/ not included in final model. ° p<.1; * p<0.05; ** p<.01; *** p<.001. R² : Nagelkerke R²

NA: not available due to insufficient expected count or high standard errors. Analyses run without this interaction term. ° p<.1; * p<0.05; ** p<.01; *** p<.001

4. Discussion

This study aimed to contribute to emerging research on the involvement of LGBQ youth in bullying and cyberbullying as compared to heterosexual youth, and on the role of gender and age in LGBQ youths' risk for involvement in traditional bullying or cyberbullying. A detailed discussion of findings is provided to hopefully inspire and generate hypotheses for further research. Such research may drill down to finer levels and investigate rare phenomena not possible to examine with our relatively small sample of LGBQ youth. Findings indicated that LGBQ youth were indeed more often victimized by traditional bullying, but no significant differences (main effect) were found between youth of various sexual orientations in their cyberbullying victimization. Heterosexual and LGBQ youth also showed no differences in their involvement as perpetrator of traditional bullying when taking other factors, such as age, gender and interaction effects, into account. LGBQ youth were significantly more often perpetrator of cyberbullying than non-LGBQ youth. Our study, moreover, observed a significant interaction with age, in which cyberbullying victimization increased with age for LGBQ youth while it decreased with age for non-LGBQ youth. Victimization and perpetration rates did not differ by gender.

The higher odds for victimization of traditional bullying among LGBQ adolescents compared to their non-LGBQ peers are in line with previous research (Birkett et al., 2009; Schneider et al., 2012; Toomey & Russell, 2016; Wensley & Campbell, 2012; Wise-Katz & Hyde, 2012). Our findings showed a more than twofold increase in the risk being victimized by traditional bullying for LGBQ youth compared to non-LGBQ youth. Contrary to our hypothesis and earlier studies (Abreu & Kenny, 2017; Hinduja & Patchin, 2011; Llorent et al., 2016; Priebe & Svedin, 2012; Schneider et al., 2012; Wiederhold, 2014), we could not confirm higher prevalence rates for cyberbullying victimization among LGBQ youth, after taking age and gender into account. Possibly, methodological differences underlie these deviations from earlier findings. First, our study used a population-based sample, which has been uncommon in earlier research (Abreu & Kenny, 2017). Prevalence rates reflect a share of population involved in cyberbullying, and consequently, it is important to use population-based samples to study these rates. This lack of population-based, representative samples in earlier research has been mentioned as a limitation to the conclusions that can be drawn on earlier reported prevalence rates (Abreu & Kenny, 2017). Second, our results showed an influence of age and gender in cyberbullying victimization. Chi² analyses, for example, showed a significantly higher rate of cybervictimization by sexual images among LGBQ youth than among non-LGBQ youth, as hypothesized and consistent with earlier findings (Priebe & Svedin, 2012). No difference was, however, found in the odds for cybervictimization by sexual images when taking gender and age into account. Some earlier studies did not include the role of age and gender when analyzing differences in cybervictimization rates between LGBQ and non-LGBQ youth (Schneider et al., 2012; Wiederhold,

2014), or analyzed rates separately for boys and girls (Hinduja & Patchin, 2011; Priebe & Svedin, 2012), which may also explain the different findings.

Literature was inconclusive regarding different rates between LGBQ and non-LGBQ youth in traditional bullying perpetration (Hinduja & Patchin, 2011; Llorent et al., 2016; Wensley & Campbell, 2012). Some research reported no difference in traditional bullying perpetration (Llorent et al., 2016), whereas others did find elevated perpetration rates among LGBQ youth (Hinduja & Patchin, 2011; Wensley & Campbell, 2012). Our study showed no significant differences between LGBQ and non-LGBQ youth. Further, in the scarce literature on this topic, LGBQ youth have been reported to have a higher level of cyberbullying perpetration by some (Hinduja & Patchin, 2011; Llorent et al., 2016), but not by others (Wensley & Campbell, 2012). Our study found a higher prevalence of cyberperpetration for LGBQ youth compared to non-LGBQ youth. LGBQ youth showed a twofold increase in risk of cyberbullying others compared to non-LGBQ youth. Previous research suggested that LGBQ youth may cyberbully others as a form of retaliation after having been victimized by bullying themselves (Hinduja & Patchin, 2011), and that it may be inappropriate coping strategy to handle negative emotions (Kowalski et al., 2014). We could also hypothesize that these higher levels of cyberbullying perpetration among LGBQ youth stem from a desire to establish their social status in their peer group (Wegge, Vandebosch, Eggermont, & Pabian, 2016) when they feel insecure about their identity or how they fit in. A recent systematic review on cyberbullying among LGBQ/transgender youth did not report on perpetration rates (Abreu & Kenny, 2017) and the scarce evidence that was found on this topic suggests more research is needed here.

There were no gender differences in the odds for victimization of traditional or cyberbullying in our study. A recent systematic review on cyberbullying victimization among LGBQ/transgender youth reported that LGBQ youth of both genders were more affected than non-LGBQ youth, but that among LGBQ youth there is an inconsistency in the role of gender in victimization: while some studies showed female LGBQ were more often victimized than male LGBQ, other research showed the opposite trend (Abreu & Kenny, 2017). These inconsistencies in literature, and when comparing our findings to some earlier research, may be better understood when taking content, type/mode and severity of bullying into account. First, our study did not ask adolescents to indicate whether bullying victimization took place because of their sexual orientation and whether it had a homophobic content. With our approach, equal rates of victimization were found between LGBQ boys and girls. A difference in content of bullying may thus explain why our results diverged from some earlier studies that documented higher rates of homophobic or sexual-orientation-based victimization and discrimination among boys than among girls (Almeida et al., 2009; Berne et al., 2014; McMaster, Connolly, Pepler, & Craig, 2002). Second, in past research, gender differences were not uniform across all types/modes and severity of bullying: LGBQ girls were more often cyberbullied by text messages, whereas boys were more often cyberbullied by pictures or films (Priebe & Svedin, 2012).

Whereas one meta-analysis demonstrated gender differences in school-based victimization among LGBQ youth (Toomey & Russell, 2016), another meta-analysis showed these gender differences were only present for certain, more violent, forms of victimization (Wise-Katz & Hyde, 2012). To conclude, it may be plausible that total rates of bullying between LGBQ boys and girls are similar, but that differences in rates appear between boys and girls depending on the content, mode or severity of bullying that was investigated. Since also traditional and cyberbullying victimization that are not violent or that are not directly identified as homophobic by the victims, have a high negative psychosocial impact (Schneider et al., 2012), future research and practice should consider a broader range of victimization experiences among LGBQ youth, and also examine content, mode and degree of violence of bullying.

Although our study did not find higher prevalence rates for cyberbullying victimization among LGBQ youth, there was, however, a significant interaction association of sexual orientation and age in their odds of being victimized by traditional bullying or cyberbullying. These moderating effects of age showed that LGBQ youth experience more traditional bullying and cyberbullying at a later age than non-LGBQ youth. This moderating effect of age on traditional bullying and cyberbullying is a striking finding in our study. Victimization from all forms of bullying except from cyberbullying via personally embarrassing images, increased with age among LGBQ youth, while it decreased or remained stable among non-LGBQ youth. A previous study found a peak in cyberbullying victimization among LGBQ adolescents in 3rd graders (mean age 14.4, SD=0.85) compared to younger or older adolescents (Llorent et al., 2016), whereas our results showed a linear increase with age for LGBQ youth. This linear increase with age for LGBQ youth may be related to romantic relations developing only towards later adolescence. Data showed around 25% of youth had a romantic relationship at age 12, whereas this figure rose to around 60% at age 16 (Carver, Joyner, & Udry, 2003). Bullying of LGBQ youth may therefore only become salient at an age when youth more often have romantic partners. Apart from starting romantic relations, the timing and extent of disclosure of non-heterosexual orientation may also explain why victimization among LGBQ youth increased with age. Age of disclosure of non-heterosexual orientation was reported to take place around the age of 16 (Rivers, 2004) to 17 (D'Augelli et al., 2002), and becoming certain of their sexual orientation at age 16 for girls and age 15 for boys (Rosario et al., 1996). Timing and extent of being open about sexual orientation were both associated with more LGBQ-specific victimization via traditional bullying (D'Augelli et al., 2002). Also for cybervictimization by sexual images, our study showed an interaction effect with age, as was found for most other forms of cyberbullying: as LGBQ youth became older, their risk of cybervictimization by sexual images increased while it remained stable among non-LGBQ youth. LGBQ youth have been reported to more often engage in sexting (sending nude or sexual pictures of themselves), but only at a later age (Ybarra & Mitchell, 2014). LGBQ youth also fear the risk of being outed in unwanted settings (e.g. school) by having sexting material forwarded (Albury &

Byron, 2016). Possibly, differences between LGBQ youth and non-LGBQ youth in cybervictimization by sexual images would therefore only occur at a later age when youth's sexual life becomes more active or visible, which seems supported by our findings.

To the best of our knowledge, our study is the first to establish a different pattern of cyberbullying victimization by age for LGBQ youth and non-LGBQ youth. These findings have important implications for intervention and prevention efforts. It has been suggested that research on bullying among LGBQ youth is currently too limited to inform prevention and intervention campaigns (Espelage, 2016). Our results contribute to this emerging evidence by pinpointing the age when tailored programs are most needed. Although most intervention and prevention efforts against bullying and cyberbullying are targeted at the general age group where a peak in prevalence is noted (i.c. middle school-aged children, (Kowalski et al., 2014; Tokunaga, 2010)), efforts are still needed at later ages for LGBQ youth who are more at risk then. Very little attention is devoted to LGBQ youth in current traditional bullying or cyberbullying prevention and intervention programs, which is evidenced by: 1) no mention whatsoever of LGBQ youth in systematic reviews of traditional bullying prevention programs (Merrell, Gueldner, Ross, & Isava, 2008; Polanin, Espelage, & Pigott, 2012; Ttofi & Farrington, 2011); 2) by the lack of tailored cyberbullying prevention programs for LGBQ youth; and 3) by the lack of attention to their specific challenges in current empirically evaluated cyberbullying prevention programs (Abreu & Kenny, 2017). Some recommendations, however, exist on how to develop such programs. In general, most evidence exists for the effectiveness of a whole-school approach in bullying and cyberbullying prevention programs, requiring the involvement of school staff, parents and peers in the efforts to reduce or prevent traditional bullying or cyberbullying (Ttofi & Farrington, 2011). At school level, having a safe environment, a positive school climate and connectedness to an adult at school can protect youth of a minority sexual orientation against traditional bullying victimization (Birkett et al., 2009; Duong & Bradshaw, 2014; Heck, Flentje, & Cochran, 2011). Safe Schools programs and policies were effective in improving psychosocial outcomes for LGBQ youth (Black, Fedewa, & Gonzalez, 2012). It is moreover recommended that LGBQ youth are actively involved in the design of a prevention program, are able to access information or report incidences anonymously without the risk of being outed, and have a school member available who is openly supportive and knowledgeable of LGBQ issues (Abreu & Kenny, 2017). An LGBQ school staff member may also serve as a positive role model to prevent bullying (Van Wormer & McKinney, 2003). The program should furthermore encourage open discussions with parents on safe technology use that can create a trusting environment to disclose or report LGBQ-specific cyberbullying (Abreu & Kenny, 2017). Peers can help protect LGBQ youth from bullying victimization via Gay-Straight Alliances (Murphy, 2012). These are peer-led extracurricular groups to support and advocate for LGBQ students. Schools with Gay-Straight Alliances were effective in protecting LGBQ from school-based bullying victimization (Marx & Kettrey, 2016; Murphy, 2012),

verbal and physical violence, bullying victimization, homophobic remarks and assaults (Murphy, 2012). To our knowledge, no effects of peer-led alliances or support programs for LGBQ youth have been documented with respect to cyberbullying involvement. LGBQ youth themselves can learn to use effective coping strategies, such as assertive coping strategies, seeking social support, and seeking distraction in positive things; and to avoid harmful coping strategies, such as substance abuse, self-blame, or behavioral disengagement (Huynh, 2015).

Prevention and intervention programs may also be needed into young adulthood. From our data, it is unclear if the linear age trend would continue into young adulthood or drop off, for example due to higher peer acceptance or better coping resources against victimization (Zimmermann & Iwanski, 2014). Evidence suggests that differences in victimization between LGBQ and non-LGBQ persist at least until college years (Walker, 2015; Wensley & Campbell, 2012). Research on differences in victimization experiences in later life between LGBQ and non-LGBQ adults, e.g. traditional bullying in the workplace, showed that LGBQ adults are also more often bullied in the workplace than others (Lewis, Giga, & Hoel, 2011). However, studies that investigated differences between LGBQ and non-LGBQ adults in cyberbullying in the workplace are to our knowledge lacking. Longitudinal studies from late adolescence to early adulthood would aid in further identifying the developmental periods when prevention and intervention programs are most needed for LGBQ persons.

5. Strengths and limitations

The study had several limitations. Despite having a large total number of adolescents, the sample of LGBQ youth was relatively small, which did not allow for detailed analyses by specific sexual minority group (LG/B/Q) and made it impossible to run certain analyses on bullying involvement with a low prevalence (e.g. cybervictimization by sexual images). Future research is needed to replicate these findings in a larger population-based sample that allows to further drill down by specific sexual minority group. Our study focused on sexual orientation and did not included transgendered youth. Since transgendered youth also experience victimization and psychosocial problems (Ybarra, Mitchell, & Kosciw, 2014), how they experience traditional bullying or cyberbullying involvement and what the associations are by age would add to limited knowledge in this field. Lastly, our study used single-item scales for some bullying involvement types, whereas multi-item scales may be preferred and recommended for future research. A strength of this study was that unlike previous research on LGBQ youth that has often used convenience samples limiting the representativeness of the sample (see e.g. (Abreu & Kenny, 2017; Bebes, Samarova, Shilo, & Diamond, 2015)), our study used a population-based sample of adolescents recruited via schools. This enabled us to also include adolescents who were unsure about their sexual orientation or had not yet disclosed their sexual orientation. Our measure of LGBQ furthermore did not rely on self-labeling as non-heterosexual, but was based on same-sex feelings, which meets a gap in existing research that heavily relies on self-labeled sexual identities (Abreu & Kenny, 2017). And lastly, our study measured cybervictimization using a

validated format and specifying various types, where further insights are needed in more diverse and detailed types, forms and content of bullying experiences.

6. Conclusions

This study found that LGBQ youth were more often victimized by traditional victimization than non-LGBQ youth and that they were more often perpetrators of cyberbullying than non-LGBQ youth. No gender differences were found, and no increased rates of traditional bullying perpetration were found once interaction effects with age and gender were taken into account. A significant interaction effect was found with age for traditional victimization, cybervictimization (single-item scale), and cybervictimization by messaging/posts, and by sexual images: these prevalence rates were higher among older LGBQ youth but decreased or remained stable among non-LGBQ youth with age. This finding highlights the need for tailored prevention and intervention programs specific for LGBQ youth in late adolescence, whereas most current programs are targeted at early adolescence when there is a peak in victimization for the general population.

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Highlights

- Non-heterosexual youth are more often victim of traditional bullying

- Non-heterosexual youth had increased rates of cyber- but not of traditional perpetration

- (Cyber-)victimization among non-heterosexual youth increased with age

- (Cyber-)victimization did not increase with age among heterosexual youth

- Targeted prevention programs for non-heterosexual youth are needed at later age

Disclosure Statement