Prevention 2.0: Targeting Cyberbullying @ School

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Abstract Although cyberbullying is characterized by worrying prevalence rates and associated with a broad range of detrimental consequences, there is a lack of scientifically based and evaluated preventive strategies. Therefore, the present study introduces a theory-based cyberbullying prevention program (Media Heroes; German original: Medienhelden) and evaluates its effectiveness. In a pretest–posttest design (9-month interval), schools were asked to randomly assign their participating classes to either control or intervention group. Longitudinal data were available from 593 middle school students (M_{Age}=13.3 years, 53 % girls) out of 35 classes, who provided information on cyberbullying behavior as well as socio-demographic and psychosocial variables. While the present results revealed worrying prevalence rates of cyberbullying in middle school, multilevel analyses clearly demonstrate the program's effectiveness in reducing cyberbullying behavior within intervention classes in contrast to classes of the control group. Hence, this study presents a promising program which evidentially prevents cyberbullying in schools.

Keywords Cyberbullying · Prevention · Evaluation · Adolescents · School

Today's unlimited provision of modern communication technologies is accompanied by free access to knowledge resources, possibilities to effortlessly exchange information, and the option of creating links across the globe toward specific communities of interest. Beyond these positive effects, this development is also characterized by worrisome media-specific behavior. In this respect, cyberbullying is a growing concern, which describes "[…] any behavior performed through electronic or digital media by individuals or groups that repeatedly communicates hostile or aggressive messages intended to inflict harm or discomfort on others" (Tokunaga 2010, p. 278).

According to this definition, our research group showed that, meanwhile, every fifth student is involved in cyberbullying in Germany, either as cyberbully, cybervictim, or both (Schultze-Krumbholz and Scheithauer 2010). Numerous surveys support these prevalence rates in all countries with nationwide media access, such as the USA (Ybarra and Mitchell 2004), Great Britain (Smith et al. 2008), Canada (Li 2006), or Australia (Hemphill et al. 2012). Although some authors describe cyberbullying rather as an exaggerated, low-prevalence phenomenon (e.g., Olweus 2012), the cumulating research literature across different studies evidentially demonstrates that cyberbullying is, in fact, characterized by prevalence rates that deserve scientific attention and call for preventive effort.

The common occurrence of cyberbullying is worrying because research repeatedly demonstrates its association with a broad range of detrimental consequences. Depending on the duration and intensity of a cyberbullying episode, these consequences include academic problems (Beran and Li 2007), psychosocial difficulties (Juvoven and Gross 2008), somatic symptoms (Gradinger et al. 2009), depression (Wang et al. 2011), externalizing problems (Schultze-Krumbholz et al. 2012a), mental health problems (Sinclair et al. 2012), and even suicidal ideation (Hinduja and Patchin 2010). Hence, just like traditional bullying, cyberbullying needs to be considered a major public health problem and requires preventive intervention programs.

In this respect, it is crucial to target preventive efforts to the specific nature of cyberbullying because—as a result of the domain-specific channel through which aggressive acts are performed—it differs essentially from traditional bullying (cf. Slonje and Smith 2008; Suzuki et al. 2012). For example, cyberbullying hardly stops: Once victimizing content goes

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online, cyberbullying continues even after attempts to delete it. This humiliation can be especially bad due to the unlimited virtual space and the worldwide breadth of potential audience. Moreover, cyberbullying is not a face-to-face experience. While this invisibility enables cyberbullies to overcome the inhibition threshold and, at the same time, reduces their chance of experiencing empathy or understanding the consequences of their victimizing behavior, it conversely causes more fear in cybervictims. Finally, cyberbullying offers fewer solution opportunities for both victims and potential bystanders.

Similar to traditional bullying, people involved in cyberbullying often know each other from the school context (Hinduja and Patchin 2008). Therefore, despite the online nature of cyberbullying, the school context seems to present a useful framework for interventions, which are ideally designed in the form of a universal prevention in order to similarly reach all students of a class.

Driven by increasing public and scientific attention, research made much progress in improving our understanding of cyberbullying within the last years. However, in spite of this progress, hardly any scientifically based and evaluated preventive strategies exist, as recently reviewed by Snakenborg et al. (2011): "Most current cyberbullying programs are based on practical beliefs about prevention and logical approaches rather than on scientific evidence" (p. 94). For this reason, we developed the comprehensive cyberbullying prevention program Media Heroes (German original: Medienhelden; Schultze-Krumbholz et al. 2012b). The present paper presents the background, structure, content, and evaluation of this program.

The Cyberbullying Prevention Program Media Heroes

Media Heroes is a universal, manualized, and school-based cyberbullying prevention program which targets middle school students and is implemented by trained and supervised teachers within the existing school curriculum. That is, Media Heroes is not a voluntary extracurricular program, but

embedded within the regular school course and, therewith, characterized by a stable framework, a regular implementation, and a familiar learning environment ensuring students' attention. Moreover, as requested by Stauffer et al. (2012), it explicitly takes teachers into account when educating them to implement the intervention. With this approach, the program is characterized by high intervention fidelity, helps schools to help themselves, and causes enduring effects because educated teachers are enabled to reapply the program with following classes without the need for external experts.

The program built on several developmental and psychological concepts as well as empirical findings within this research field, but the core of its theoretical background is reflected best with the theory of planned behavior (Ajzen 1991), as illustrated in Fig. 1. The rationale of this theoretical approach derives from studies which successfully explained cyberbullying behavior with the help of this model or its components (Heirman and Walrave 2012; Roberto and Eden 2010).

Based on this model, we aim to reduce cyberbullying behavior by addressing knowledge and competencies. This contains the psychoeducation of definitions, legal rights, online security options, as well as the training of social skills, such as perspective-taking skills. In addition, the program focuses on attitudes toward the target behavior. This includes raising students' awareness concerning the consequences and legal risks of cyberbullying. At the same time, Media Heroes seeks to change existing norms according to the program objectives, which covers, for example, the improvement of social responsibility or the overall class climate. Finally, the program aims to increase students' behavioral control, which includes the provision of online protective and helping strategies for oneself and others when confronted with cyberbullying. In accordance with the theoretical model, all of these aspects will lead to the intention and, finally, realization of the targeted behavior, namely, reduced cyberbullying behavior.

The content of this theoretical model was translated into two program versions: a long version of 10 weeks with a 90-

Fig. 1 Theory of planned behavior applied to the cyberbullying prevention program Media Heroes
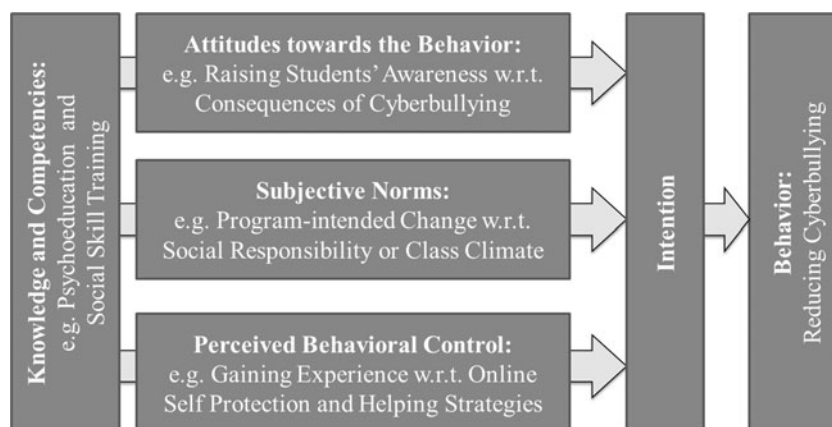
min session per week and a short version of 1 day with four 90-min sessions. The reason for this differentiation is twofold: First, the additional short version of the program provides teachers and schools with an economic alternative in case they are unable to realize the complete program within their regular school curriculum. The second reason refers to the option of comparing both versions within the evaluation of the program, which improves the degree of information regarding its effectiveness.

As outlined in Table 1, the program includes subsequently implemented modules that build on each other, are differentiated in accordance with their content, and utilize established

Table 1 Modules of Media Heroes

Module: Preventive element	Description	Explanation
1 Pros and Cons of New Media: Psychoeducation	Students are introduced to the program.	The first module provides the necessary basis for the program by educating facts concerning and sensitizing students for new media.
2 Definition and Consequences: Psychoeducation	Cyberbullying and students' attitudes to it are addressed.	As cyberbullying is a function of attitudes toward and norms about this behavior (Ajzen 1991; Barlett and Gentile 2012), this module aims at raising students' awareness concerning cyberbullying as well as its consequences.
3 Feelings & Perspectives: Empathy Training	Students examine different cyberbullying perspectives.	It is crucial to adopt different perspectives including their associated feelings in order to train students' social skills and empathy in particular because cyberbullies were repeatedly found to have deficits in this respect (Ang and Goh 2010).
4 Participant Roles: Role Play	Students experience different cyberbullying perspectives.	This cognitive-behavioral method teaches the existence of different bullying roles (cf. Salmivalli 1999), repeats the training of perspective-taking skills, and provides knowledge concerning the role-specific contribution in reducing cyberbullying.
5 Internet Safety: Peer-to-Peer Tutoring	More experienced and supervised students teach their peers regarding online-protective skills.	When students communicate the content of a program, its objectives are lectured by people who are more accepted by the target group (Harden et al. 2001), which improves both the transfer of knowledge and the transportation of values. Moreover, in this module, tutors experience self-efficacy (Bandura 1997) and tutored students the zone of proximal development (Vygotsky 1987).
6 Legal Range of Actions: Moral Dilemma	In an imitated court of law, the class considers legal consequences of a cyberbullying episode.	This element aims to inform about the legal options and consequences of cyberbullying and to improve students' moral skills as low levels have been found to represent an evidential risk factor for cyberbullying (Perren and Gutzwiller-Helfenfinger 2012).
7 Parent Evening: Peer-to-Parent Tutoring	Prepared students educate their parents regarding new media and cyberbullying.	On the one hand, this component serves as information for the parents. On the other hand, it motivates students to collect information concerning new media and cyberbullying and reflect about these facts on their own. Hence, this element supports the participation, self-organization, and empowerment of students.
8 Reflection: Psychoeducation	Students repeat the content of the program.	The final module provides the opportunity to consolidate and reflect the knowledge and competencies required within the course of the program.

prevention elements. In a reduced form, the majority of modules are similarly applied in the short version, so that in general, both versions contain the same content.

Objectives and Hypotheses

The purpose of the present study was to evaluate the cyberbullying prevention program Media Heroes. In a pretest–posttest control group design, we analyze the effectiveness of both program versions with regard to the reduction of cyberbullying behavior while controlling for socio-demographics as well as the initial psychosocial constitution of students and the class.

In this respect, multilevel modeling (Raudenbush and Bryk 2002) is the method of choice, because it takes into account two important aspects. First, the present school-based evaluation is characterized by an inherently nested data structure (students as units of classes). Each student is shaped by a particular social–academic setting with specific social influence processes (McPherson et al. 2001), so that students within a school class are more similar to each other than students between school classes. Second, in order to examine the effectiveness of the present school-based program, the intervention effect has to be modeled on the contextual level. Although this conservative procedure causes loss of statistical power, it is the most correct statistic for evaluating group-wise conducted programs, in which a cluster of individuals represents the unit of intervention. Thus, multilevel modeling adequately accounts for the present nested data structure and allows for a correspondence between the unit of intervention and the unit of measurement. The following hypotheses will be tested:

1. A decrease in cyberbullying behavior will result in school classes, which took part in the cyberbullying prevention program Media Heroes.
2. The long version of the program is more effective than the short version of the program, which, in turn, is more effective than the control group in reducing the target behavior.

Method

Sample

Five schools from a large German city voluntarily participated in a research project in which we implemented and evaluated the program Media Heroes outlined above. Within the sampling procedure, we asked schools to randomly assign all participating classes to both treatment conditions and to provide one control group class for each participating intervention class, which entails two advantages: First, the groups do not vary as a function of systematic school differences and second, this procedure takes into account that students in the control group receive the program by an educated teacher after the evaluation period, which ensures the ethical responsibility to provide the program content to all participating students, in case of proven effectiveness.

Complete longitudinal data were available from 593 middle school students out of 35 middle school classes ranging from 7th to 10th grades. All students participated on the basis of informed consent. While the dropout of 19 % is unaffected by sex ($z=-0.82$, $p>0.05$) and group status ($z=-1.85$, $p>0.05$), participants without longitudinal data are from higher classes ($z=3.17$, $p<0.05$). However, this mean age difference with a magnitude of 5 months is marginal, so that the overall attrition rate can largely be considered as unbiased and unsystematic. The average age of participants was 13.3 years (SD=1.0) with a gender ratio of 53 % girls to 47 % boys. Because in Germany it is not acceptable to ask students about their ethnicity, no data are available in this respect. However, the vast majority of German students are Caucasian, while all remaining students with foreign background are predominantly of Turkish descent or Eastern European origin.

Design

The project started with a teacher training (8 h in 2 days) in which the participating teachers were educated to implement the program in accordance with our standards. Thereafter, the pretest was conducted in the complete sample, followed by the treatment period in which one group of students attended the long version of the program ($n=194$, 33 %), one group attended the short version ($n=104$, 18 %), and one group, the control group, received no treatment ($n=295$, 50 %). Finally, about 9 months after the pretest, the posttest was conducted in order to test the long-term effects of the program. As a result of the successfully conducted randomization, the three evaluation groups were balanced across grades ($h(2)=1.13$, $p>0.05$) within gender-equalized classes ($h(2)=2.25$, $p>0.05$), so that the treatment conditions resemble each other with regard to their socio-demographic constitution.

Measures

All measures relied on the administration of standardized student questionnaires within the evaluation at the pre- and posttest. Data collection took place during regular class periods under the supervision of trained research assistants.

Cyberbullying Behavior

At pre- and posttest, we assessed cyberbullying behavior with a self-constructed questionnaire developed within the framework of the current research project (cf. Brighi et al. 2012; for further information, see also Del Rey et al. 2012). On 11 items (e.g., "I say mean things or verbally harass others by using the mobile phone or the computer"), students were asked to indicate how often they victimize their peers within the virtual context during the previous 2 months by using a five-point Likert scale (0= *never* to 4=*more than once a week*). The mean score constituted the scales cyberbullying behavior at the pretest and at the posttest with reliabilities of Cronbach's α=0.82 and 0.92, respectively. In order to analyze the treatment effectiveness, we calculated a change score for each student by subtracting the pretest score from the posttest score, so that a negative value represents a decrease in cyberbullying behavior.

Perspective-Taking Skills

At the pre- and posttest, students rated their perspective-taking skills by utilizing the respective subscale from the interpersonal reactivity index (Davis 1983; German translation: Lamsfuss et al. 1990). On eight items (e.g., "I sometimes try to understand my friends better by imagining how things look from their perspective"), students rated the extent to which these statements apply to them by using a five-point scale (from 1=*never true* to 5=*almost always true*). The mean score represents the scales perspective taking at the pretest and at the posttest with reliabilities of Cronbach's α=0.84 and 0.89, respectively.

Aggressive Behavior

At the pre- and posttest, students rated their aggressive behavior by utilizing an instrument covering instrumental and reactive aggression within the analog and virtual world (Little et al. 2003; German translation and cyberspecific extension: Gradinger et al. 2009). On 14 items (e.g., analog-reactive aggression, "When I'm hurt by someone, I often fight back"), students rated the extent to which these statements apply to them by using a four-point Likert scale (from 1=*not true* to 4 =*completely true*). The mean score represents the scales aggressive behavior at the pretest and at the posttest with reliabilities of Cronbach's α=0.91 and 0.93, respectively.

Statistical Analyses

In a first step, we examined the prevalence rates of cyberbullying as well as sex and age differences in this regard. In a second step, we applied multilevel modeling (Raudenbush and Bryk 2002) to test the program's effectiveness while considering the nested data structure and the required correspondence between the unit of intervention and the unit of measurement. For this purpose, a two-level random intercept model predicted the change in cyberbullying behavior by using socio-demographics and psychosocial variables on level 1 (student level) as well as class-aggregated psychosocial equivalents and the treatment condition on level 2 (class level). The treatment condition was modeled with two dummy variables, which specified the effect of both program versions by contrasting their respective effectiveness with that of the control (reference) group's. All continuous variables were z-standardized, separately on each level regarding their respective overall mean, to facilitate the interpretation of the regression coefficients from variables with different scaling formats and across different levels.

Results

Prevalence Rates of Cyberbullying

In order to examine cyberbullying behavior from a longitudinal perspective without confounding developmental and treatment effects, all analyses within this first result section merely consider the control group (n=295), which does not differ from the other two treatment groups with regard to the initial cyberbullying behavior at the pretest [$F(2,590)$=0.63, $p >$ 0.05]. Once again, this finding underscores the successful randomization within the sampling procedure and the necessary pretest comparability of all treatment conditions.

Table 2 reports the descriptives of cyberbullying in the control group. The mean score of cyberbullying behavior is rather low at both the pretest and the posttest. However, this scale summarizes cyberbullying across different domains (e.g., social exclusion, verbal harassment, or identity theft) and combines both the existence of this behavior as well as its frequency. On the item level, the percentage of students that report to cyberbully repeatedly corresponds with the common prevalence rates of about 10 %. That is, while the mean score of cyberbullying as a composition of prevalence rates and frequencies is rather low, the picture changes completely when we merely look at the occurrence of this behavior. This prevalence is alarming not only due to its magnitude, but also because of its development: Within the 9 months from pretest to posttest, the mean score of cyberbullying behavior increased significantly [$t(294)$=−2.08, p <0.05]. In contrast to this worrying development in the control group, the corresponding treatment-based development within the intervention groups will be presented in the final result section.

For more detailed analyses, we compared the mean score of cyberbullying behavior between boys and girls and, differentiated by median split, young (11–13 years) and old students (14–17 years). The respective group-wise descriptives are presented in Table 2. Group analyses were examined using a 2×2 (sex, age group) multivariate analysis of variance. At

Table 2 Descriptives in the control group along with age and gender group differences

	Cyberbullying behavior—T1		Cyberbullying behavior—T2	
	Mean score (SD)	Occurrence[a] (%)	Mean score (SD)	Occurrence[a] (%)
Total	0.08 (0.23)	10	0.15 (0.51)	11
Boys	0.11 (0.32)	14	0.24 (0.71)	16
Girls	0.06 (0.10)	7	0.06 (0.13)	6
11–13 years	0.06 (0.19)	8	0.15 (0.53)	10
14–17 years	0.12 (0.29)	15	0.14 (0.47)	12

Control group: $n = 295$ students

[a] Percentage of students that report to cyberbully repeatedly (i.e., indicate on at least one item to cyberbully at least "once or twice a month")

both occasions, sex yielded a significant effect favoring boys regarding the engagement in cyberbullying behavior [$F(1, 291)=4.59$, $p<0.05$ and $F(1,291)=9.30$, $p<0.01$, respectively]. While older students tended to report cybervictimizing their peers more often at the pretest [$F(1,291)=3.35$, $p<0.10$], this age effect disappeared at the posttest [$F(1,291)=0.09$, $p>0.05$]. Based on the contrary development that younger students increased [$t(185)=-2.17$, $p<0.05$] and older students remained stable with regard to their cyberbullying behavior [$t(108)=-0.47$, $p>0.05$], this rendered age effect suggests that cyberbullying reaches its peak in middle adolescence. In any case, these group comparisons underscore the need to consider sex and age as socio-demographic controls within the following multilevel analyses.

Intervention-Based Change in Cyberbullying

The change scores in cyberbullying, perspective-taking skills, and aggressive behavior between the control and both intervention groups indicate the hypothesized effects from pre- to posttest, as supported by the significant overall group differences of the multivariate analyses of variance (see Table 3). In comparison to the total sample, cyberbullying increases in the control group, remains stable in the short-intervention group, and decreases in the long-intervention group. Furthermore, both psychosocial variables improve accordingly to the program's objectives in the intervention groups in contrast to the control group. Post hoc comparisons (Scheffé) indicated that the control group differed on cyberbullying, perspective-taking skills, and aggressive behavior compared to the long-intervention group as well as on perspective-taking skills and aggressive behavior compared to the short-intervention group, while both intervention groups do not differ significantly from each other.

For examining these intervention-based group differences in accordance with the group-wise conduction of the program, we evaluated the treatment effectiveness of Media Heroes on the contextual level by analyzing the change in students' cyberbullying behavior within a multilevel framework. For this purpose, we utilized a two-level random intercept model with 593 students on level 1 and 35 classes on level 2. The results are reported in Table 4, which covers two models: the null (unconditional) model without any predictors determining the variance component across the two levels and the full (main effect) model with socio-demographics on level 1, the initial psychosocial constitution on levels 1 and 2, and the treatment condition on level 2.

The null model revealed an intraclass coefficient of 0.04 on the class level, indicating that 4 % of the variance in changed cyberbullying behavior is on the contextual level, while the remaining 96 % exists on the individual level. This variance between classes differs significantly from zero [$\chi^2(34)=57$, $p<0.01$], which justifies the multilevel approach.

The full model strongly supports the effectiveness of Media Heroes: Both dummy variables on level 2, each for one program version, yielded a significant negative effect, implicating that the participation of classes within the intervention predicted a negative change score which, in turn, represents a decrease in cyberbullying behavior in contrast to the control group. Although the effects of both program versions tended to differ in the hypothesized manner, the difference between both regression coefficients missed the level of significance ($p>0.05$). Interestingly, the decrease in cyberbullying behavior was more pronounced for classes characterized by high aggregated scores in perspective-taking skills. All effects were controlled for sex, age, individual psychosocial variables, and their corresponding contextual equivalents.

Table 3 Intervention-based change in cyberbullying behavior and psychosocial variables

	Control group		Short-intervention group		Long-intervention group		MANOVA (overall test)
	M	SD	M	SD	M	SD	F(2,576)
Cyberbullying	0.12	1.23	0.00	0.68	−0.19	0.68	5.42*
Perspective Taking	−0.12	1.01	0.13	1.05	0.11	0.93	4.13*
Aggression	0.14	1.02	−0.19	0.80	−0.12	1.03	5.91*

Z-standardized change scores;

*$p<0.01$ (one-tailed significance)

Table 4 Multilevel prediction of change in cyberbullying behavior

	Null model			Full model		
	B	p	SE	B	p	SE
Level 1: Students						
Sex[a]				0.16	*	0.09
Age				0.08	*	0.04
Perspective-taking skills at T1				−0.12		0.08
Aggressive behavior at T1				−0.11		0.13
Level 2: Classes						
Short-intervention group[b]				−0.27	*	0.15
Long-intervention group[b]				−0.38	**	0.11
Perspective-taking skills at T1[c]				−0.50	*	0.22
Aggressive behavior at T1[c]				−0.12		0.35
L1 variance (R)	1.11			1.09		
L2 variance (U_0)	0.04			0.02		

L1: 593 students, L2: 35 school classes

*$p < 0.05$; **$p < 0.01$ (one-tailed significance)

[a] 0=girls, 1=boys

[b] Coded as a dummy variable with the control group as a reference category

[c] Aggregated scores

Discussion

The present study aimed at introducing and evaluating the program Media Heroes, which is, to our knowledge, the first comprehensive, scientifically based cyberbullying prevention program. The main findings of the study refer to the occurrence of cyberbullying and the program's effectiveness in preventing it.

Prevalence of Cyberbullying

Over the last years, bullying expanded its area of occurrence and has entered the virtual world. As expected, specific acts of cyberbullying were found to occur frequently: Considering only the perspective of cyberbullies, about every tenth student reported to cybervictimize others repeatedly. These findings support the literature with regard to the ubiquity to which cyberbullying occurs in adolescence (e.g., Schultze-Krumbholz and Scheithauer 2010).

Within the examined evaluation period, the frequency of cyberbullying even increased over time. It is noteworthy that this prevalence is based on the control group and, therefore, corresponds to the development without any treatment, so that this empirical pattern represents the situation when children are left alone with the problem of cyberbullying. Despite this general trend, the present study uncovered specific developmental patterns concerning the frequency of cyberbullying:

While younger students increase in this regard, older students remain stable over the almost 1-year evaluation period. In accordance with Tokunaga's (2010) seminal review, this developmental course suggests that middle adolescence seems to present a sensitive phase with regard to the occurrence of cyberbullying behavior, which underscores the fit of Media Heroes for the application during this age period.

In sum, the magnitude and development of these prevalence rates highlight the necessity of targeting cyberbullying in school, which is, at the same time, an applied area with room for improvement (Snakenborg et al. 2011). Especially in middle adolescence, effective cyberbullying prevention programs are urgently needed, as suggested by the present findings concerning the development of cyberbullying behavior.

Program Effectiveness of Media Heroes

To our knowledge, the program Media Heroes is the first comprehensive attempt to prevent cyberbullying in schools. Built on the theory of planned behavior (Ajzen 1991) and by utilizing a coordinated sequence of well-established preventive elements (cf. Table 1), this cyberbullying prevention has the scientific background necessary for expecting reasonable effects.

In accordance with our first hypothesis, the average cyberbullying behavior decreased in classes that received the intervention, while controlling for socio-demographics and initial psychosocial constitutions. Our second hypothesis was verified in part, as the effects of all three treatment conditions differed in the expected manner, but the gradual differentiation between the short- and long-intervention group missed the level of significance. In all likelihood, this result is a consequence of examining the effect of both groups on the contextual level with no more than 35 units of analyses. Notwithstanding the inherently lack of statistical power, this comparison points into the expected direction and suggests the hesitant conclusion that the program effectiveness increases with the length of intervention.

Furthermore, these results also allow identifying beneficial factors which support the effectiveness of cyberbullying prevention programs. In this regard, aggregated perspective-taking skills were found to be associated with a general decrease in cyberbullying behavior. That is, classes with a high mean in perspective-taking skills seem to feature a structure and atmosphere in which the program's operating mechanisms are boosted by a synergistic overall dynamic. This contextual effect underscores the relevance of training perspective-taking skills within this cognitive-behavioral program. It is of vital importance to continue exploring conditions under which the effectiveness of preventive strategies can be optimized in order to improve and fine-tune future programs.

Due to the fact that perspective-taking skills and aggressive behavior represent competencies, one of the theoretically

formulated model components (cf. Fig. 1), the descriptive change scores in Table 3 suggest not only the expected intervention-based effects concerning the main outcome variable, but also regarding the theoretically postulated mediators by which the program is hypothesized to unfold its efficacy. When students are educated concerning the consequences of their behavior, encouraged to reflect their virtual activities, and guided to train behavioral alternatives, these preventive actions—embedded within a structured and comprehensive program—unfold their full effectiveness and evidentially reduce cyberbullying behavior among middle school students. This effectiveness is of specific practical value due to the possible enduring effects that Media Heroes causes in schools. In line with the premise of helping schools help themselves, the conceptualization of Media Heroes enables teachers to repeatedly conduct the program with following classes and thus provides schools with a permanent strategy of preventing cyberbullying.

Limitations and Future Research Directions

An important limitation refers to the fact that all findings of the present study rely on students' self-reports. However, due to the invisibility and anonymity of cyberbullying, it is almost impossible to assess cyberbullying using external ratings (e.g., teachers) or objective measures. We took this limitation into account by assessing cyberbullying with a questionnaire covering the occurrence as well as frequency of a broad range of different cyberbullying domains. Nonetheless, an improved psychometric assessment of cyberbullying behavior is certainly a challenge for future studies (cf. Ybarra et al. 2012).

Although the prevalence of cyberbullying reaches its peak in middle adolescence, an additional elementary version of Media Heroes is needed because cyberbullying starts before middle school and media skills are lacking especially in younger children. Therefore, our main future research direction is the adaptation of this effective program for younger age groups.

The present multilevel evaluation design enabled us to examine the program's efficacy in the most accurate way. In this vein, we considered the nested data structure and were able to reconcile the unit of evaluation with the unit of intervention. However, this conservative method lacks statistical power for more detailed forms of analyses that would allow verifying the theoretically postulated factors by which the program is assumed to unfold its efficacy. Initial results that proved the program's general efficacy and indicated the hypothesized change of specific mediators (i.e., perspective-taking skills and aggressive behavior) are encouraging, but at the same time call for intensified empirical efforts in future studies. More specifically, in order to evaluate whether Media Heroes effectively addresses knowledge, competencies, attitudes, norms, and the perceived behavioral control, which are assumed to lead to an intended and actual decrease in cyberbullying behavior, further studies with different statistical approaches are needed for analyzing the operating mechanisms of this program.

With the introduction to and evaluation of the present cyberbullying prevention, we hope to provide a helpful strategy against cyberbullying. We believe that Media Heroes presents a promising program, which has the potential to guide future preventive approaches and help students, teachers, and schools confronted with this new form of virtual victimization.

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