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CRIMES AGAINST CHILDREN RESEARCH CENTER

A Systematic Review of Effective Youth Prevention Education: Implications for Internet Safety Education

Lisa M. Jones, Kimberly J. Mitchell, and Wendy A. Walsh

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This Bulletin is one of two published by the Crimes Against Children Research Center (CCRC) based on findings from a 2012 study: "The Evaluation of Internet Child Safety Materials Used by ICAC Task Forces in School and Community Settings" funded by the National Institute of Justice (NIJ). The study involved a process evaluation of the current approach to Internet Safety Education with the aim of providing recommendations for future prevention efforts in this area. Both bulletins can be found on the CCRC website: www.unh.edu/ccrc/internet-crimes/papers.html and the NIJ project report can be found at: https://www.ncjrs.gov/pdffiles1/nij/grants/242016.pdf.

ABSTRACT: Over the past two decades, a wide array of internet safety education materials and programs have developed to increase positive youth behavior and safety online. Although it is a new area of prevention, programs should incorporate practices that prior prevention evaluation studies tell us work best. To inform internet safety education, 31 youth prevention education meta-analyses across a wide range of youth prevention (substance abuse, risky sex behavior, delinquency, etc.) were coded to identify prevention program characteristics shown by research to be most effective. The review identified that active, skill-based lessons, focused on research-based causal and risk factors, and provided with adequate dosage were key. Such strategies must be included as a starting place when developing prevention in new areas of youth risk concerns. Implications of the finding suggest some need for re-evaluating how internet safety education is delivered in the future.

As youth internet use first expanded in the 1990s, publicity about online predators raised alarms about the extent that children and adolescents were at risk for sexual abuse and exploitation while online. More recently, cyberbullying victimization, "sexting" behavior and concerns about online privacy breaches and reputational risks have added to parental and community worries (Hinduja & Patchin, 2010; Juvonen & Gross, 2008; Marwick, Murgia Diaz, & Palfrey, 2010; Steeves & Webster, 2007; Strassberg, McKinnon, Sustaita, & Rullo, 2013).

In response to these concerns, an enormous mobilization of prevention efforts ocurred. A wide array of internet safety education materials and programs were developed to warn youth about online risks (The Online Safety and Technology Working Group, 2010) and schools have become active in implementing prevention efforts, often involving law enforcement in delivering Internet safety programs (Jones, Mitchell, & Walsh, 2012). The Protecting Children in the 21st Century Act, signed into law by President Bush in 2008, requires schools receiving federal funds for Internet access to educate children about appropriate online behavior.

Unfortunately, the prevention and educational response to internet safety has so far followed a pattern reminiscent of problematic responses to earlier youth safety crises. In the 1970s, for example, anxiety about youth using illegal drugs spawned an array of drug education programs warning youth about the dangers (Gorman, 1997, 1998). The programs ballooned in popularity, but did little to stem the tide, and were judged belatedly by evaluation studies to be largely ineffective (Clayton, Cattarello, & Johnstone, 1996; Ringwalt et al., 2009). Drug prevention education was eventually retooled, and a second generation of programs developed with the aid of evaluation research proving to be more successful (Botvin, 2000; Norman & Turner, 1993; Pentz, 2003).

But millions of dollars and thousands of hours were squandered in the process.

The approach to internet safety education has been similar in some ways to the early approach to youth drug abuse concerns. The education and prevention programs have been rapidly developed and disseminated, with content mostly designed around dramatic and serious cases popularized in the media or recounted by law enforcement. Although national research on youth internet safety has been slowly building, there has been limited effort by program developers to design interventions around identified causal and risk factors. Rigorous evaluation has not been included to check on program effectiveness, and there have not even been efforts to define the specific behavioral outcome goals of these programs or initiatives. Even after two decades of program development, there have been few improvements in these gaps or changes in the approach to internet safety education.

The rapid development of internet safety education programs likely occurred because stakeholders felt an urgency to protect youth from an emerging area of perceived danger. But even in times of perceived crisis, and perhaps especially under such circumstances, it is critical to make sure that programs are having the intended effect.

Planning for evaluation and its eventual use should always be included at the outset of any new prevention campaign where youth behavior change is the ultimate goal. However, the cycle of conducting rigorous evaluation and using the results to refine subsequent prevention approaches does take time. Those anxious to put educational programs in place may feel that moving internet safety education to scale quickly must take priority. There is no reason however that program developers should not at a minimum draw on previous knowledge about what works and does not work when convincing youth to reduce risky behaviors. **When responding quickly to any new concern for youth, program developers should incorporate as many program elements as possible that have been demonstrated to be effective in related areas of youth prevention education.** And in an absence of evaluation data, consumers and policy-makers should select and promote these kinds of evidence-informed programs.

What Do We Know About What Works in Youth Prevention?

Internet safety education is designed with the aim that youth will make safer choices about online relationships and online behavior, perpetrate less harassment, and behave more kindly in communicating with peers; and that, because of these changes, they and others will experience less harm online as a result over the long-term. Although the internet and new technology represents a relatively new and rapidly changing method of communication for youth with some unique characteristics (e.g., visibility of communication), what youth are doing online is not that much different from what they have been doing for generations—interacting with peers, exploring relationships, and establishing and experimenting with identity (Boyd, 2014). The worries we have about their behavior online is very similar to worries we have had for a long time about their behavior offline. And it turns out the many of the strategies designed to help youth make good health and relationship decisions focus on similar risk and protective factors (Botvin, Schinke, & Orlandi, 1995; Boustani et al., 2014; Durlak, 1998). Our growing knowledge about how to help youth avoid other complexly rooted harms (e.g., sexually transmitted diseases, early pregnancies, bullying and dating violence, sexual assault, or drug overdose) will likely translate to preventing online harms as well.

There have been a number of efforts to identify common characteristics of successful youth education prevention programs (Luna & Finkelhor, 1998; Nation et al., 2003; National Institutes of Health, 2004). These reviews have noted, for example, that the use of extreme examples, fear-inducing tactics, and lectures focusing mostly on delivering information are less effective; and that skill-based programs with active learning strategies and defined theoretical rationales are more effective. However, these summaries have been casual reviews. A more systematic review was conducted for bullying prevention programs (Ttofi & Farrington, 2009), but findings focused on interventions very specific to preventing school-based aggression, such as playground supervision, and classroom rules and management.

In order to inform internet safety education program design, we conducted a systematic review of effective elements of youth prevention education than, making the search broad enough to incorporate learning across a wide range of youth prevention areas (substance abuse, risky sex behavior, delinquency, etc.). Specifically, we coded thirty-one youth prevention education meta-analyses to gather information on prevention program characteristics shown by research to be most effective.

METHODOLOGY

Sample

Psychinfo, Medline, Criminal Justice Abstracts, ERIC and the library of the Campbell Collaborative were searched comprehensively using multiple keyword variations for summaries, reviews, and meta-analyses of youth prevention program evaluations. Eleven prevention areas were considered: substance abuse; violence, bullying and delinquency; risky sex behavior; mental health; sexual abuse; suicide; obesity and eating disor-

ders; dating violence; driving safety; skin cancer; and general youth prevention education. Two senior researchers selected abstracts that met the following definition: "An article, report or book chapter published between 1990 and 2013 that summarized, contrasted, or compared the effectiveness of two or more prevention programs or approaches delivered to youth." The search resulted in 424 documents including 73 meta-analyses meeting the definition. The researchers then reviewed the text of these documents to identify those that reported on better or worse performing characteristics of the reviewed youth prevention programs. The second review resulted in the identification of 41 meta-analyses, 22 systematic reviews, and 14 informal reviews meeting this criterion.

Given the substantial number of meta-analyses meeting our definitional criteria, and given the greater rigor provided by these types of studies, only meta-analyses were included in the review. We further determined that 31 of the meta-analyses provided unique information on whether at least one program or audience characteristic was related to the effectiveness of the reviewed prevention programs.

The 31 meta-analyses examined programs focused on a variety of youth problems (See Appendix). The number of studies or programs reviewed in each meta-analysis ranged from 8 to 213, with an average of 68. Ninety-four percent of the meta-analyses focused on programs with behavioral or symptomatic outcomes. The remaining six percent of studies measured attitude or knowledge outcomes only.

Coding

Coding the meta-analyses proceeded in two stages. The first stage involved a qualitative review in which a total of four senior researchers (two per publication) listed program characteristics tested by the meta-analysis. Coders were instructed to identify characteristics across two categories: 1) program features, defined as "any feature of the prevention program, curricula, or approach (e.g., theoretical approach, type of program leader, length of program, activities)," and 2) participant features, defined as "features of the audience or intended participants (e.g., risk-level, age, gender)."

For 25 out of the 31 meta-analyses, or 81% the 2 coders were in perfect agreement on the types of characteristics measured by the study. For 5 meta-analyses, agreement ranged from 63-85%. For one meta-analysis, one coder identified 1 element and the other identified 3 for a 33% agreement rate. Discrepancies were resolved by group review.

The final list of tested characteristics included the following: 1) "active" prevention education strategies (e.g., role-playing); 2) parent involvement; 3) the use of theory in program design; 4) narrow vs. broad behavioral targets; 5) the inclusion of homework; 6) the use of booster sessions; 7) program leader type; 8) program dose; 9) the number of types of prevention strategies used by programs; and 10) the involvement of a community-level or "environmental" component. Even though there was some overlap with the categories above , we also included separately as an 11th characteristic the SAFE characteristics (sequenced, active, focused, and explicit) analyzed in Durlak et al.'s meta-analysis (2011) since these elements had been studied together. The six participant characteristics studied by the meta-analyses included: 1) participant age, 2) SES-level, 3) risk-level, 4) gender, 5) race and ethnicity, and 6) urbanicity.

An 82-question coding form was then developed to determine whether these 17 different prevention program elements resulted in: 1) significantly greater effect sizes; 2) significantly smaller effect sizes; or 3) non-significant differences between programs. All 31 of the meta-analyses were double-coded by the research team using this coding form. Cohen Kappa coefficients were between .80 and 1.00 for 43 or 52% of questions. For another 27 or 33% of questions, the Kappa coefficients fell between .60 and 89. For the remaining 18%, reliable coding could not be established.

Four program characteristics were dropped from consideration of their relationship to program effectiveness due to low Kappas: **1)** the number of types of prevention strategies used in a program; **2)** the involvement of a community-level or "environmental" component in some programs; **3)** the racial and ethnic makeup of the targeted audience and **4)** the geographic location of the program (urban, suburban, or rural). The difficulty in reliable coding was due in part to unclear ways that these characteristics were defined and measured in the meta-analyses. All remaining disagreements between coders were resolved through discussion.

RESULTS

The results of the coding process are presented below for each of the coded program and participant characteristics.

Prevention Program Characteristics

1. Active participation versus information-delivery only. Twenty-three of the reviewed meta-analyses compared different types of prevention approaches or strategies. In four studies, not enough information was given to determine whether the approaches were active or non-active. Six studies (26%) compared different kinds of "active" approaches (e.g., skill-building, interactive tasks, role-playing, group problem-solving, or rehearsal) to each other. However, 13 out of 23 studies (57%) compared active and non-active approaches (lecture or information-

Table 2. Effectiveness of Prevention Program Characteristics (N=31)

	Characteristics	Total #	# More Effective	# No Difference	# Less Effective
1.	"Active" prevention program strategies vs. non-active	13	12	1	--
2.	Parent involvement	7	2	4	1
3.	Theory-based	3	2	--	1
4.	Narrow vs. broad problem behaviors targeted	3	1	1	1
5.	Sequenced, active, focused and explicit (SAFE)	2	2	--	--
6.	Homework	1	1	--	--
7.	Booster sessions	1	1	--	--
8.	Program leader				
	Peers/students	9	4	3	2
	Teachers/Other school professionals	15	2	5	8
	Specialists	14	6	6	2
	Police officers	2	--	1	1
9.	Program dose (sessions, hs, or weeks)				
	One v. more than one	3	--	--	3
	12 or less vs. more	8	2	5	1
	19 or less vs. more	3	1	1	1
	Less vs. more (continuous)[1]	6	1	5	--

[1] The study with positive findings for fewer sessions reported that reviewed programs ran an average of 41 sessions (Duralk, 2011); The 5 studies finding no difference for program dose reviewed programs with the following reported

only). For the 13 meta-analyses that compared analyzed this comparison, the overwhelming majority (12 meta-analyses or 92%) found that the active programs were significantly more effective than lecture only (See Table 2)

2. Parent involvement. Seven meta-analyses examined the difference in effectiveness when involving parents as a part of the prevention program. Findings were mixed. While two meta-analyses found parent involvement resulted in increased effectiveness, four meta-analyses found no significant difference when parents were involved, and one meta-analysis found less effectiveness for parent-involved programs. Some of the differences in findings may be related to differences in how parents were involved. Sometimes parents were trained as co-leaders in the intervention, sometimes they were provided with educational sessions or interventions separately. And sometimes the program was delivered to both parents and children together. The one meta-analysis finding lower levels of effectiveness for parent-involved programs concluded that these programs were more complex to deliver and had a harder time maintaining high program involvement and fidelity (Park-Higgerson, Perumean-Chaney, Bartolucci, Grimley, & Singh, 2008).

3. Programs that are theory-based or target established risk factors. Three of the reviewed meta-analyses measured the impact of having a program that is "theory-based." Two meta-analyses found that theory-based programs were more effective than non-theory-based programs. Specifically, one study found that programs based on prior research or on a specified theory outperformed programs guided by investigator-driven hypotheses or those with no stated hypotheses (Haney & Durlak, 1998). Another meta-analysis found greater effectiveness for interventions that focused on research-based risk factors for eating pathology versus non-established risk-factors (Stice, Shaw, & Marti, 2007). However, a third meta-analysis found that programs that specified a logical path between the program strategy and the targeted problem performed less well than those that did not (Park-Higgerson et al., 2008).

4. Narrow versus broad focus. Three meta-analyses examined the effectiveness of focusing on a narrow versus broad category of problem behaviors. Findings were mixed. One study found that prevention programs focusing solely on weight change were more successful than programs that tried to affect a range of healthy behaviors (Stice, Shaw, & Marti, 2006). However, a different meta-analysis found that programs targeting just tobacco use were less effective than those that focused on alcohol/drug use or health in general (Rooney & Murray, 1996). And a third study found that programs focusing on aggression and violence in general versus a particular aggression problem (e.g., bullying, gang violence) were equally effective (Hahn et al., 2007).

5. Sequenced, Active, Focused, and Explicit (SAFE). Two meta-analyses (Durlak et al., 2011; Durlak, Weiss-

berg, & Pachan, 2010) found that prevention programs were more effective when they were 1) sequenced (taught children skills sequentially from less complex to more complex) ; 2) active (required youth to act on the material, practice and receive feedback); 3) focused (adequate time, effort and attention to skill-building), and 4) explicit (clear and specific learning objectives). Durlak and colleagues also found that program effectiveness increased when a greater number of these 4 elements were included in a program.

6. Homework. One meta-analysis found that the inclusion of homework assignments was significantly associated with higher effect sizes for programs targeting depression (Stice, Shaw, Bohon, Marti, & Rohde, 2009).

7. Booster sessions. One meta-analysis found that prevention programs offering "booster sessions" (typically follow-up shorter programs offered a year or more after the original program) were associated with larger effects at a 1 year follow-up for smoking prevention (Rooney & Murray, 1996).

8. Program leaders. Seventeen meta-analyses compared the effects of using different program leaders. The types of leaders analyzed by the studies were highly varied and the reviewed meta-analyses compared leader types in different ways, making it difficult to synthesize findings. We identified whether the following types of leaders were studied: 1) peers (either programs led solely by peers/youth or co-led with other adults); 2) school professionals, including teachers; 3) specialists (mental health or health professionals, experts, researchers, or grad students); or 4) police officers. Each group was then coded for whether they were associated with significantly improved or reduced effectiveness, or no difference, when compared with the other groups used in the meta-analysis.

The use of peer-education in prevention efforts could be a promising approach for internet safety programs and seven out of nine meta-analyses looking at this found evidence of greater or equal effectiveness for peer-led programs compared to programs that were led by adults only. The only meta-analysis that specifically compared peer-led and adult-led programs found peer-led programs to be more effective (Cuijpers, 2002). On the other hand, two meta-analyses found lower effect sizes when involving peers, but one case involved the use of peer mediation and peer counseling to address bullying, which is not recommended (Stop Bullying Now!). And the other case involved a meta-analysis that combined peer leaders and lay adult leaders and found that both of these groups were less effective compared to specialists for programs targeting youth depression.

In general, programs led by specialists (e.g., program developers, prevention agency staff, mental health professionals, graduate students) were found to be more effective than other adult leaders (e.g., teachers and school staff): six meta-analyses found this to be the case. However six other meta-analyses found no difference for specialists compared to other leaders. Many of the meta-analyses found that specialists were more likely to deliver the programs with fidelity.

9. Program dose**.** Twenty out of 31 of the reviewed meta-analyses measured the effect of program dose on effectiveness. Different metrics and varying timeframes were used by the studies. Some studies measured dose in terms of weeks, sessions, or hours; other studies looked at session length or distribution (number of times per week). To simplify we coded four categories separately: 1) studies that compared 1 session programs to programs lasting more than one session; 2) studies that compared programs lasting up to 8-12 sessions versus those that ran longer; 3) studies that compared programs lasting up to 16-19 sessions versus those that ran longer; and 4) studies that measured length continuously.

Findings across the three meta-analyses that compared single-session programs to longer ones all found single-session programs to be less effective than multiple-session programs. However, beyond this comparison, the findings of our review of the meta-analyses did not find that substantially longer programs were more effective than shorter programs. In fact, several meta-analyses found that shorter programs performed better than longer-running programs (Durlak et al., 2011; Rooney & Murray, 1996; Stice et al., 2009; Stice et al., 2006). The study with positive findings for fewer sessions reported that reviewed programs ran an average of 41 sessions (Duralk, 2011).

Participant Characteristics

1. Age. Twenty-three of the 31 meta-analyses looked at the effect of participant age on the effectiveness of the program. Table 3 displays the findings of the 23 meta-analyses roughly according to the age groups that were compared. Most of the meta-analyses found that the age of the participant was not a significant factor. Exceptions to this finding were four meta-analyses that compared pre-kindergarteners and kindergarteners to older elementary youth. Three of these four meta-analyses examined the effectiveness of sexual abuse prevention programs (Davis & Gidycz, 2000; Heidotting, Keiffer, & Wegener Soled, 1995; Rispens, Aleman, & Goudena, 1997). The authors suggest that the greater retention by the youngest participants could be due to this age group starting off with less knowledge and experience about the issues being taught, but they also suggest that the programs directed to older youth might have involved less activity and more lecture. Davis and Gidycz (2000) found specifically that the programs targeted to children with a mean age higher than eight were less likely to include "active participation, behavioral skills training and more than three sessions of instruction."

Table 3. Relationship of Participant Characteristics to Program Effectiveness (N=31)

	Participant Characteristics	Total #	# More Effective	# No Difference	# Less Effective
1.	Participant age				
	Pre-K/K vs. older elementary	4	4	--	--
	Elementary v. MS/HS	9	1	6	2
	Middle School vs. High School	8	1	4	3
	Continuous (Younger vs. Older)	2	1	1	--
2.	SES				
	Low SES vs. middle SES or mixed	4	2	2	--
3.	Risk-level				
	High-risk/indicated vs. no-risk/ universal	13	8	4	1
4.	Gender				
	All/mostly males vs. all/mostly females	10	1	5	4

2. SES. Four meta-analyses looked at the effect of socio-economic status on the effectiveness of the reviewed programs. Two found no difference across SES groups and two meta-analyses found that those targeted to lower SES groups of youth were more effective.

3. Risk-level. Thirteen meta-analyses compared the effectiveness of programs that were provided to universal populations of youth versus to either at-risk youth, or to those already participating in or experiencing the problem behavior being addressed (indicated). While several studies (5) found no differences for this variable, the majority of studies—eight meta-analyses—found that programs targeted to high-risk or indicated youth were more effective than universal programs.

4. Gender. Finally, 10 meta-analyses looked at the effect of gender and results were mixed. Half of the studies found no difference with regard to the gender makeup of the youth. Four, however, found that programs targeted mostly to girls were more effective than those targeted to boys. Only one study found that programs targeted to boys were more effective.

DISCUSSION

For almost 50 years, rigorous evaluation has been conducted on youth prevention education in an effort to improve a range of problems for youth. Many of the markers of effective prevention appear to cross-cut problem-areas, and newer areas of prevention, such as internet safety education, should build on what has been learned. The 31 meta-analyses of youth prevention education reviewed in this study identify that the most effective programs help youth build cognitive and behavioral skills related to the problem of interest with active strategies like role-playing, rehearsal, and problem-solving over at least several sessions. Programs did not need to be very lengthy to be effective, but dose was important and follow-up opportunities to learn or practice, such as with homework or booster sessions, increased effectiveness. The involvement of parents, teachers, and youth themselves as leaders or co-leaders holds promise, although the circumstances under which such involvement is most effective needs to be better understood.

Implications for Internet Safety Education

The review findings have important implications for improvements to internet safety education. Even before outcome evaluations are conducted, we can identify program strategies that are more or less likely to work based on prevention science. One of the most consistent findings is the importance of active learning. A problem identified with early smoking and drug abuse programs in the 1970s was a reliance on an "information-deficit" approach: the assumption that youth chose to smoke and use drugs because they didn't understand the consequences (Hwang, Yeagley, & Petosa, 2004). Later programs drew from an understanding that peer group relationships and influence were driving use and sought to provide youth with skills to evaluate peer influence and resist peer pressure. Like early drug use education, internet safety programs mostly have relied on a strategy of providing youth with information: that there are people online who may have harmful intentions; that cyberbullying hurts people; or that information youth post online may be permanent and spread by others quickly, for example. However, with problems that have complex behavioral causes, just providing youth with information is not sufficient.

Switching to an "action-oriented" internet safety prevention education approach will require better specification of the skills youth need to avoid the kinds of online problems that stakeholders are worried about. What cognitive, social or emotional skills do youth need to stay safe online? It is not clear that the internet safety education field has adequately wrestled with that question. The literature on prevention best-practices has emphasized the importance of using theory to design prevention efforts (Nation et al., 2003), and we found some support for that.

Developers should define the risk and causal factors they are targeting, the rationale behind their program approach, the cognitive, social or emotional skills they are seeking to build, and the final behavioral outcomes they are hoping to impact.

Finally, the results of this review support that single-session, assembly-style programs that have marked much of the internet safety education efforts are not likely to work. Policy-makers and consumers should not provide support to programs designed to be delivered in this way. There need to be at least several lessons, each building on the learning from the previous one. A long history of educational research has determined that youth must have time with program content and get experience practicing and using new skills and strategies (Bonwell, Eison, & Bonwell, 2000). Our review suggests that getting a chance to practice in different environments (e.g., with homework), and having the information reiterated after some time (booster sessions) increases positive outcomes. Internet safety education lends itself well to practicing in multiple environments—youth could engage in active debate and role-plays in class, practice exercises online while at school (participating in a blog or forum where they practice providing civil debate, supportive feedback, or de-escalation), and then work at home with parents (e.g., helping their parents review privacy settings.).

Beyond these clearly recommended practices, internet safety education programs might benefit from considering other prevention strategy features found to be effective in this review under at least some circumstances. Although there have been mixed results for the involvement of parents and youth as program leaders, there were a number of meta-analyses that found effective involvement of these groups. With some review of this literature program developers could likely identify some promising ideas for testing parent and peer involvement in internet safety education programs. In particular, given that internet problems tend to be most prevalent among older youth (Jones, Mitchell, & Finkelhor, 2012), training youth peer leaders, or including youth in delivering program material could be a particularly promising avenue for future education efforts. The areas for which there has been some evidence of effectiveness for youth involvement as leaders, substance abuse (Cuijpers, 2002) and HIV prevention (Maticka-Tyndale & Barnett, 2009), are similarly problems that affect greater percentages of older versus younger youth.

There appears to be some indication in the prevention meta-analyses we reviewed that when programs are targeted to "at-risk" samples, they are able to show greater effectiveness. This may be because the base rate of the problems (or the likelihood of the problems occurring in the near future) are higher to begin with among these youth, so less powerful research is needed to show a program effect. Nonetheless, internet education programs might want to consider developing programs specifically for the youth most at-risk for the online problems they are targeting, something that hasn't been done yet. But given the mix of findings for participant characteristics, and that a large number of meta-analyses looking at different problem areas found no difference across different groups of youth, building and implementing a strong program with the characteristics listed above appear to be more critical features to target for helping youth retain knowledge, and change behavior.

Applying these best practice prevention strategies to internet safety education may require the field to consider and possibly change some aspects of its approach. So far, typical internet safety education programs have focused on a variety of potential online problems: cyberbullying, risky online romantic relationships or contact with adults, digital reputations, and avoiding cyber-scams, for example. However, these problem areas are all likely to have different causal and risk factors, and may ultimately require different educational and preventive approaches. It may be that to be effective, program are going to have to be developed around individual online risk concerns.

Such compartmentalization however might add to the prevention burden already experienced by parents, youth organizations and schools. There is only so much time that can be spent exposing youth to prevention education. Internet safety concerns have to compete with education on drug abuse, sexual abuse, sexual harassment, bullying, and HIV and pregnancy prevention. Handling this issue by resorting to quick, one-hour school assemblies is not going to help address important problems, and will likely waste resources. If internet safety concerns are serious issues, youth should not be short-changed with ineffective strategies. Instead internet safety education developers should consider combining forces with traditional offline programs that target similar problems. Existing bullying programs could add information on cyberbullying. Sexual education programs could add information on online relationships (Finkelhor, 2014) Even traditional prevention programs are increasingly using combination approaches for youth problems that have similar causal roots such as bullying and dating violence (Espelage, Low, Polanin, & Brown, 2013).

Study Limitations

It is a positive sign for knowledge growth that we were able to identify thirty-one meta-analyses that examine which characteristics of prevention education improve efficacy. However, the meta-analyses included in this review often categorized and measured key variables differently, and used different meta-analytic standards and strategies, so there were a number of prevention strategies with mixed impact that may prove to be highly effective with additional research.

Furthermore, while many of the strategies used to educate youth, affect behavior, and prevent problems cross-cut the particular concern being addressed, there are likely program strategies that work more successfully or less successfully with different specific problem areas. For example, using health professionals to lead obesity prevention or smoking prevention programs may be more effective than using them in violence prevention programs.

Finally, it was clear from the reviewed meta-analyses that many program characteristics are correlated. For example, the greater finding of effectiveness for specialist program leaders was possibly related to issues of program fidelity. While the program characteristics identified as most effective represent best guesses given the status of prevention science at this point, further research will be needed to isolate which factors causally improve youth behavior and risk and why.

Conclusions

With a span now of about twenty years of internet safety education efforts, we find efforts to address this area of potential risk for youth lacking a foundation based on previous prevention science. As it moves forward, proponents should draw from knowledge we have on how to best help youth build safety, awareness and decision-making skills. **Research reviewed in this paper identifies that active, focused, skill-based lessons, focused on causal and risk factors identified by research, with adequate dosage are key.** Using such strategies may require re-evaluating early approaches and conceptualizations of the field's approach to internet safety education. The lessons drawn here extend to any new of concern for youth safety. As youth are faced with risk from new types of crime, new drug use patterns, or new technology developments, even if there is a need to move quickly, it is important to use research to understand the nature of the risk and it causes, build interventions based on success with similar problems, and use evaluation to be sure programs are truly helping youth.

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FOR FURTHER INFORMATION

The Crimes Against Children Research Center (CCRC) conducts a wide range of research on youth Internet safety. Descriptions of this research and links to our papers can be found on the CCRC website: http://www.unh.edu/ccrc/internet-crimes/

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APPENDIX: META-ANALYSES INCLUDED IN REVIEW

Prevention topic area	Included meta-analyses	Number of reviewed studies	Date range for reviewed studies
Drug/ Alcohol/ Tobacco	Bruvold, W. H. (1993). A meta-analysis of adolescent smoking prevention programs. *American Journal of Public Health, 83*(6), 872-880.	94	1971-1989
	Cuijpers, P. (2002). Peer-led and adult-led school drug prevention: A meta-analytic comparison. *Journal of Drug Education, 32*(2), 107-119.	12	1982-1995
	Ennett, S. T., Tobler, N. S., Ringwalt, C. L., & Flewelling, R. L. (1994). How effective is drug abuse resistance education? A meta-analysis of project DARE outcome evaluations. *American Journal of Public Health, 84*(9), 1394 -1401.	8	1981-1994
	Gottfredson, D. C., & Wilson, D. B. (2003). Characteristics of effective school-based substance abuse prevention. *Prevention Science, 4*(1), 27-38.	94	1979-2002
	Hwang, M. S., Yeagley, K. L., & Petosa, R. (2004). A meta-analysis of adolescent psychosocial smoking prevention programs published between 1978 and 1997 in the United States. *Health Education & Behavior: The Official Publication Of The Society For Public Health Education, 31*(6), 702-719.	65	1978-1997
	Rooney, B. L., & Murray, D. M. (1996). A meta-analysis of smoking prevention programs after adjustment for errors in the unit of analysis. *Health Education Quarterly, 23*(1), 48-64.	90	1974-1991
	Tobler, N.S. (1992). Drug prevention programs can work: Research findings. *Journal of Addictive Diseases, 11*(3), 1-28.	91	1972-1984
	Tobler, N. S., & Stratton, H. H. (1997). Effectiveness of school-based drug prevention programs: A meta-analysis of the research. *The Journal of Primary Prevention, 18*(1), 71-128.	120	1977-1991
Mental health	Durlak, J. A., & Wells, A. M. (1997). Primary prevention mental health programs for children and adolescents: A meta-analytic review. *American Journal of Community Psychology, 25*(2), 115-152.	177	1958-1991
	Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child 116Development, 82*(1), 405-432.	213	1955-2007
	Haney, P., & Durlak, J. A. (1998). Changing self-esteem in children and ado-le69scents: A meta-analytic review. *Journal of Clinical Child Psychol47ogy, 27*(432-433).	116	1958-1990
	Horowitz, J. L., & Garber, J. (2006). The prevention of depressive symptoms in children and adolescents: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 74*(3), 401-415.	30	1987-2005
	Jane-Llopis, E., Hosman, C., Jenkins, R., & Anderson, P. (2003). Predictors of efficacy in depression prevention programmes: Meta-analysis. *British Journal of Psychiatry, 183*, 384-397.	69	1985-2003
	Stice, E., Shaw, H., Bohon, C., Marti, C. N., & Rohde, P. (2009). A meta-analytic review of depression prevention programs for children and adolescents: Factors that predict magnitude of intervention effects. *Journal of Consulting and Clinical Psychology, 77*(3), 486-503.	47	1987-2008
Obesity/ eating disorders	Seo, D.-C., & Sa, J. (2010). A meta-analysis of obesity interventions among U.S. minority children. *Journal of Adolescent Health, 46*, 309-323.	40	1999-2007
	Stice, E., Shaw, H., & Marti, C. N. (2006). A meta-analytic review of obesity prevention programs for children and adolescents: The skinny on interventions that work. *Psychological Bulletin, 132*(5), 667-691.	64	1982-2006
	Stice, E., Shaw, H., & Marti, C. N. (2007). Meta-analytic review of eating disorder prevention programs: Encouraging findings. *Annual Review of Psychology, 3*, 207-231.	38	1987-2003

Prevention topic area	Included meta-analyses	Number of reviewed studies	Date range for reviewed studies
Cross-topic	Durlak, J. A., Weissberg, R. P., & Pachan, M. (2010). A meta-analysis of after-school programs that seek to promote personal and social skills in children and adolescents. *American Journal of Community Psychology, 45*, 294-309.	69	1979-2005
Risky sexual behavior	Jemmott, J. B., III, Jemmott, L. S., Peterson, J. L., & DiClemente, R. J. (2000). HIV behavioral interventions for adolescents in community settings *Handbook of HIV prevention* (pp. 103-127). Dordrecht Netherlands: Kluwer Academic Publishers.	21	1990-1998
	Kalichman, S. C., Carey, M. P., & Johnson, B. T. (1996). Prevention of sexually transmitted HIV infection: A meta-analytic review of the behavioral outcome literature. *Annals of Behavioral Medicine, 18*(1), 6-15.	12	1989-1995
Sexual abuse	Davis, M. K., & Gidycz, C. A. (2000). Child sexual abuse prevention programs: A meta-analysis. *Journal of Clinical Child Psychology, 29* (2), 257-265.	27	1985-1995
	Heidotting, T., Keiffer, S., & Wegener Soled, S. (1995). A quantitative synthesis of child sexual abuse prevention programs. Paper presented at the Paper presented at the annual meeting of the American Educational Reserach Association, New Orleans, L.A.	18	1985-1992
	Rispens, J., Aleman, A., & Goudena, P. P. (1997). Prevention of child sexual abuse victimization: A meta-analysis of school programs. *Child Abuse & Neglect, 21*(10), 975-987.	16	1985-1996
Youth violence, delinquency, bullying	Farrington, D., & Ttofi, M. (2009). School-based programs to reduce bullying and victimization *Campbell Systematic Reviews* (pp. 147).	44	1983-2009
	Ferguson, C. J., San Miguel, C., Kilburn, J. C., Jr., & Sanchez, P. (2007). The effectiveness of school-based anti-bullying programs: A meta-analytic review. *Criminal Justice Review, 32*(4), 401-414.	42	1995-2006
	Hahn, R., Fuqua-Whitley, D., Wethington, H., Lowy, J., Liberman, A., Crosby, A., . . . al., e. (2007). The effectiveness of universal school-based programs for the prevention of violent and aggressive behavior (pp. 1-16): National Center for Helath Marketing and Division of Health Communication and Marketing.	53	1981-2004
	Losel, F., & Beelmann, A. (2003). Effects of child skills training in preventing antisocial behavior: A systematic review of randomized evaluations. *Annals of the American Academy of Political and Social Science, 587*, 84-109.	135	1971-2000
	Park-Higgerson, H.-K., Perumean-Chaney, S. E., Bartolucci, A. A., Grimley, D. M., & Singh, K. P. (2008). The evaluation of school-based violence prevention programs: A meta-analysis. *The Journal of School Health, 78*(9), 465-479.	26	1977-2004
	Wilson, D. B., Gottfredson, D. C., & Najaka, S. S. (2001). School- based prevention of problem behaviors: A meta-analysis. *Journal of Quantitative Criminilogy 17*(3), 247-272.	165	Not provided
	Wilson, S. J., & Lipsey, M. W. (2006a). The effects of school-based social information processing interventions on aggressive behavior: Part I: Universal programs *Campbell Systematic Reviews*.	47	1974-2004
	Wilson, S. J., & Lipsey, M. W. (2006b). The effects of school-based social information processing interventions on aggressive behavior: Part II: Selected/indicated pull-out programs *Campbell Systematic Reviews* (pp. 37).	73	1976-2004