

# Overprotective Parenting and Peer Victimization in Extremely Low Birth Weight Survivors

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**Abstract** Extremely low birth weight (ELBW; <1000 g) survivors are at increased risk for experiencing both peer victimization and overprotective parenting. This study investigated if overprotective parenting moderated associations between peer victimization and psychopathology among ELBW adult survivors who have been followed since birth. Participants included 81 (31 male, 50 female) adults born with an extremely low birth weight from Ontario, Canada. The participants were predominately Caucasian. The experience of peer victimization and overprotective parenting prior to age 16 was self-reported at age 22–26 years. Peer victimization was reported using the Childhood Experiences of Violence Questionnaire and overprotective parenting was reported using the Parental Bonding Instrument. Current anxiety disorder and alcohol or substance use disorder was assessed using the MINI International Neuropsychiatric Interview at age 29–36 years. The experience of overprotective parenting moderated the association between peer victimization and risk for an anxiety disorder in adulthood (OR 2.35, 95% CI, 1.01–5.50). If the ELBW survivor reported having an overprotective parent, peer victimization was associated

with increased risk for having an anxiety disorder in adulthood (OR 2.45, 95% CI, 1.13–5.30). In contrast, this association was not significant in the absence of an overprotective parent (OR 1.04, 95% CI, 0.73–1.49). Future research should further investigate if parental support and encouragement of children's independence may be important for reducing the negative effects of peer victimization among ELBW survivors.

**Keywords** Infant · Extremely low birth weight · Parenting · Longitudinal · Mental disorders · Peer victimization

## Introduction

Infants born at extremely low birth weight (ELBW; <1000 g) are the tiniest and most vulnerable babies and are at increased risk for psychiatric disorders in adulthood (Boyle et al. 2011; Hack et al. 2004; Lindström et al. 2009; Lund et al. 2011; Mathewson et al. 2017; Van Lieshout et al. 2015). Researchers have found that these individuals may be at particularly high risk for developing anxiety disorders, but at lower risk for developing alcohol or substance use disorders in adulthood than those born at term (Cooke 2004; Hack et al. 2002; Van Lieshout et al. 2015). As a result of these uniquely high levels of anxiety and low rates of alcohol or substance use disorders in adulthood between those born ELBW and at term, it is of interest to explore the different risk factors that may explain this pattern of findings and be possible avenues for future interventions.

One significant risk factor for developing psychiatric disorders is the experience of peer victimization (McDougall and Vaillancourt 2015), something ELBW survivors

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appear to be at greater risk for than their typically developing counterparts (Day et al. 2015). Peer victimization is the repetitive and intentional aggressive behavior that occurs between people of unequal power status (Olweus 1999). Experiencing peer victimization increases the risk of developing internalizing problems in late adolescence (Schwartz et al. 2015), as well as anxiety disorders such as panic disorder and generalized anxiety disorder by 2–5 times (Copeland et al. 2013). In a meta-analysis of 29 longitudinal research studies, Ttofi et al. (2011) found that youths who experienced peer victimization were twice as likely to be depressed up to 36 years later. In addition, victims of bullying have been found to be more likely to drink alcohol and use substances (Marschall-Lévesque et al. 2017; Tharp-Taylor et al. 2009; Vieno et al. 2011). Associations between peer victimization and psychiatric disorders in ELBW survivors have recently been reported (Day et al. 2016), but the risk and protective processes involved in these associations have not been investigated.

An additional potential risk factor for adult psychopathology in ELBW survivors is the experience of overprotective (i.e., controlling and intrusive) parenting. Indeed, these individuals are at greater risk for having parents who are overprotective (Feldman 2007; Forcada-Guex et al. 2006; Indredavik et al. 2005; Jaekel et al. 2012; Wightman et al. 2007), possibly because of parental perceptions of increased vulnerability; which likely results from the significant prenatal and postnatal adversities parents face as a result of their infants being born preterm (Pyhälä et al. 2011). Having an overprotective parent is itself also associated with an increased risk for a range of psychiatric problems in the children, including anxiety disorders (Edwards et al. 2010; Hudson and Rapee 2001; Spokas and Heimberg 2009; Wood et al. 2003) and alcohol or substance use problems (Bernardi et al. 1989; Emmelkamp and Heeres 1988; Visser et al. 2012). Parenting of those born preterm is an important avenue for future research as it is one possible means of intervention by which long term outcomes can be improved (Jaekel 2016).

As the antenatal factors that contributed to being born at ELBW, and their resulting effects on development already put ELBW survivors at greater risk for psychopathology, it is necessary to examine which factors put these survivors at greater risk and what protects them. In fact, being born ELBW is associated with a higher likelihood of being shy and risk averse (Schmidt et al. 2008; Waxman et al. 2013), which may lead survivors to be even more affected by peer victimization and overprotective parenting. As ELBW survivors have been independently found to be at increased risk for peer victimization (Day et al. 2015) as well as experiencing overprotective parenting (Feldman 2007; Forcada-Guex et al. 2006; Indredavik et al. 2005; Jaekel et al. 2012; Wightman et al. 2007), these two factors are ideal for

examining the combined effects on psychopathology in adulthood.

In this study, we examined how experiencing overprotective parenting and peer victimization interacted to predict anxiety disorder and alcohol or substance use disorders in adulthood in a cohort of ELBW survivors. As previous research has shown that supportive parenting can be significant moderator by buffering against the negative effects of adversity (Pettit et al. 1997), we predicted that experiencing overprotective parenting would be a risk factor in addition to peer victimization that would lead to a higher risk for anxiety and alcohol or substance use disorders in adulthood. We examined whether reporting having an overprotective parent moderated associations between peer victimization and anxiety disorders and alcohol or substance use disorders into the fourth decade of life in the oldest, longitudinally-followed cohort of ELBW survivors.

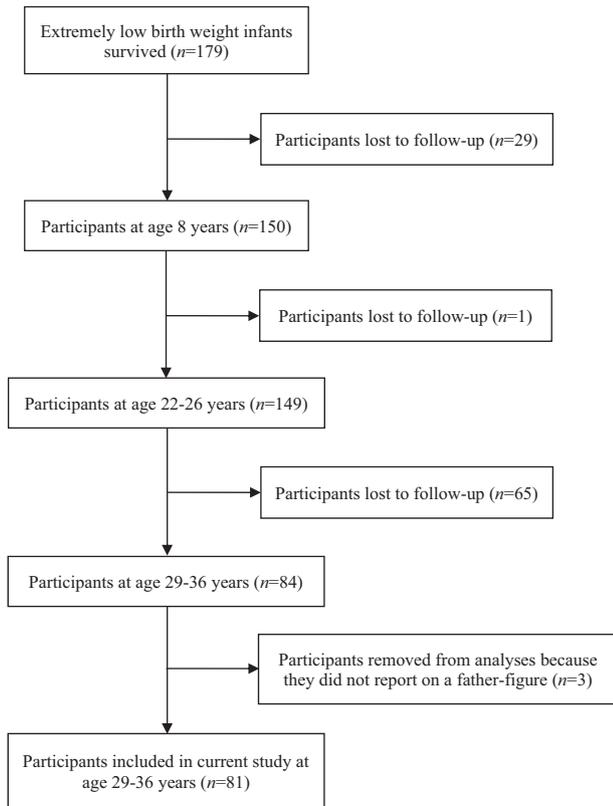
## Method

### Participants

Participants included ELBW survivors originally recruited at birth (Saigal et al. 1984) between 1977 and 1982 ( $n = 179$ ) in the southwestern Ontario, Canada area. The participants have been followed to age 29–36 years (see Saigal et al. 2016). For this study, we used data collected at ages 8 ( $n = 150$ ), 22–26 ( $n = 149$ ), and 29–36 ( $n = 84$ ) (see Fig. 1). Participants with data at the outcome visit (age 29–36,  $n = 84$ ) were used in analyses. Within the sample of 84, two participants did not report on a father-figure, one participant did not report on a father-figure and did not have familial SES, behavior problems, and family function. This resulted in a sample size of 81 participants (31 male, 50 female). The participants were predominately Caucasian (90.1%) and had a mean household income (CAD) of \$54,520.55 ( $SD = \$41,701.35$ ) at the age 29–36 year visit. McMaster University's and Hamilton Health Sciences' ethics committees provided approval for the use of the human participants for this study. Written informed consent was obtained from parents (age 8) and participants (age 22–26 and 29–36).

### Procedure

During study visits, trained lay interviewers who were unaware of participant birth weight status, as well as their experience of parenting and peer victimization, collected study information using interviews and questionnaires completed by those born ELBW and their parents. At birth, information was collected from their medical records (see Saigal et al. 1984, for more information). At age 8, parents reported on demographic



**Fig. 1** Extremely low birth weight participants at each wave of data collection

information, including participant sex and SES, family function, and childhood emotional and behavioral problems (see Saigal et al. 1991 for more information). At age 22–26 (see Boyle et al. 2011 for more information) and 29–36 (see Van Lieshout et al. 2015 for more information), those born ELBW completed the visits without their parents.

## Measures

### *Predictor: peer victimization*

At age 22–26 years, participants retrospectively reported on their experiences of peer victimization prior to age 16 using two items from the Childhood Experiences of Violence Questionnaire (CEVQ; Walsh et al. 2008). Participants reported their experiences with verbal victimization (“Sometimes kids get hassled or picked on by other kids who say hurtful or mean things to them. How many times did this happen to you before age 16?”) and physical victimization (“Sometimes kids get pushed around, hit or beaten up by other kids or a group of kids. How many times did this happen to you before age 16?”) on a 5-point scale (1 = never, 5 = more than 10 times). The two measures of peer victimization were correlated ( $r = .41$ ,  $p < .001$ ) and summed to create a 10-point measure as higher levels of

peer victimization have been found to have a strong and graded association with psychiatric problems (Due et al. 2005).

### *Moderator: overprotective parenting*

At age 22–26 years, participants retrospectively reported on their mothers and fathers using the Parental Bonding Instrument (PBI; Parker 1988). Participants answered 25-items on a 4-point Likert-type scale (1 = Very like, 4 = Very unlike), with 13 of the items combined into an overprotective scale (Parker 1988) that has good reliability (for this sample:  $\alpha = .84$  mother,  $\alpha = .87$  father) and has strong reliability and validity over recall periods up to 20 years (Wilhelm and Parker 1990). Sample items for the overprotective scale include, “Invaded my privacy” and “Tried to control everything I did.” Scores of  $>13$  on the maternal or  $>12$  on the paternal scale were coded as overprotective according to Parker (1988). The measure was dummy coded (0 = neither parent over protective, 1 = at least one parent overprotective).

### *Outcomes: anxiety and alcohol or substance use disorders*

At age 29–36 years, current anxiety and alcohol or substance use disorders were measured using the Mini International Neuropsychiatric Interview (MINI; Sheehan et al. 1997). This validated, structured interview assessed psychiatric disorders according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) and the International Classification of Diseases, 10th Revision. The MINI has been found to have good agreement with the Structured Clinical Interview for DSM-IV disorders and the World Health Organization Composite International Diagnostic Interview, and has strong interrater reliability (Sheehan et al. 1998). For the current study, the interview was conducted by two trained graduate psychology students blind to participant birth weight status. The procedures for this sample have been reported previously (Van Lieshout et al. 2015). Anxiety disorders and alcohol or substance use disorders were chosen as outcomes because they are of particular interest for researchers when investigating psychopathology of ELBW survivors. It has been shown that adults born very prematurely are at increased risk for anxiety disorders, but lower risk for alcohol or substance use disorders (Cooke 2004; Hack et al. 2002; Van Lieshout et al. 2015). Participants were deemed to have an anxiety disorder if they had current panic disorder, agoraphobia, social phobia, obsessive-compulsive disorder, and/or generalized anxiety disorder on the MINI. If they had any of these diagnoses they were given a “1”, while those without were given a “0”. The presence of any alcohol or substance use disorder was defined as having

any one of current alcohol abuse, alcohol dependence, drug abuse, or drug dependence. If they had any of these diagnoses they were given a “1”, while those without were given a “0”.

#### *Birth variables*

Participant sex, birth weight, gestational age were recorded at birth and collected from their medical charts.

#### *Childhood variables*

To reduce the impact of possible confounding variables (Copeland et al. 2013; McDougall and Vaillancourt 2015; Raby et al. 2015; Reijntjes et al. 2010; Wolke et al. 2013), we adjusted for participant sex and SES, family function, and childhood emotional and behavioral problems which were measured at age 8.

Familial SES was measured using the Hollingshead (1969) two-factor (education and occupational prestige) index of social position (1 = highest SES, 5 = lowest SES).

When participants were 8 years old, their parents completed the McMaster Family Assessment Device General Functioning subscale (Byles et al. 1988; Epstein et al. 1983) which measured the functioning of the family. Its 12 questions were summed to measure concepts such as whether family members turn to each other in crisis (for this sample:  $\alpha = .91$ ).

Parents also completed the Child Behavior Checklist (CBCL; Achenbach 1991) when participants were age 8. The total problems scale, which measures maladaptive behavior, was computed (for this sample:  $\alpha = .93$ ). Raw scores of 46 for boys and 45 for girls, which equated to a T-score of 64, were used as cut-off scores for having behavior problems in the analyses (Achenbach 1991) in order to have a measure of clinically significant levels of maladaptive behavior. The scale was dichotomized for analyses (0 = not clinically significant levels, 1 = clinically significant levels).

#### *Participant attrition*

As this sample has been followed into adulthood, attrition could affect the validity of analyses. Within the sample of 81, three participants were missing data for behavior problems and family function, and an additional participant was only missing family function. Therefore, differences between participants and non-participants at age 29–36 were investigated. We examined the following variables for their ability to predict non-response: sex, gestational age, birth weight, familial SES, childhood emotional and behavioral problems, family functioning, peer victimization, and overprotective parenting.

Those who participated at both the birth ( $n = 179$ ) and age 29–36 ( $n = 77$ , 43%) visits were more likely to be female ( $X^2(2, N = 179) = 6.38, p = .01$ ), and those who participated at both the age 8 ( $n = 150$ ) and age 29–36 visits ( $n = 77$ , 51%) were more likely to have a higher SES ( $M$  difference 0.37 (95% CI, 0.07–0.67)). There were no other significant differences. Given these results, in addition to controlling for familial SES, family functioning, and childhood emotional and behavioral problems, we also controlled for the sex of the participants in order to attempt to minimize the possible impact of our predictors of attrition.

Little’s MCAR (missing completely at random) test suggested that the missing data was MCAR when comparing those with missing data ( $n = 77$ ) and those with complete data at age 29–36 years ( $n = 84$ ),  $x^2 = .10, p = .75$ . Furthermore, Little’s MCAR test suggested that the missing data was MCAR when comparing those with missing data ( $n = 77$ ) and the original participants ( $n = 179$ ),  $x^2 = .19, p = .66$ .

Analyses were conducted using IBM SPSS Statistics 24 (IBM Corporation). Missing data for all covariates were imputed using the fully conditional specification. Data on our covariates were imputed to increase our statistical power and to ensure that the sample was representative of all participants who completed our outcome measure (Chevret et al. 2015). Thirty imputation data sets were created, and the results for each outcome utilized the results of the pooled data.

#### **Data analyses**

Associations between peer victimization, overprotective parenting, and psychiatric disorders in ELBW survivors were examined after controlling for participant sex, familial SES, family functioning, and childhood emotional and behavioral problems. Continuous predictor and covariate variables were centered as recommended (Aiken and West 1991). Any significant interactions by the presence of an overprotective parent were subsequently probed by reversing the dummy coded overprotective parent variable, creating a new interaction variable, and re-running the regression analyses (Aiken and West 1991). The slopes of the significant interaction variables were then graphed (Aiken and West 1991; Dawson 2014).

#### **Results**

There were 81 ELBW (31 male, 50 female) participants with complete data included in analyses (see Table 1). The mean birth weight was 826.60 grams ( $SD = 133.21$ ) and the mean gestational age was 27.04 weeks ( $SD = 2.32$ ). The

mean familial SES level was 3.11 (1 = highest SES level, 5 = lowest SES level). Thirty-one (38.30%) of the ELBW participants had clinical levels of total behavior problems and the mean level of family functioning was 20.55 (SD = 5.01) at age 8. The mean level of peer victimization was 4.99 (SD = 1.87). Peer victimization was experienced by the majority of ELBW survivors ( $n = 74, 91.36\%$ ) and 33 (40.70%) of the participants reported having at least one overprotective parent. Lastly, 18 (22.20%) of the participants were diagnosed with an anxiety disorder and 10 (12.30%) of the participants were diagnosed with an alcohol or substance use disorder.

After controlling for participant sex, familial SES and general functioning, and child total behavior problems, overprotective parenting (Table 2) significantly moderated the association between peer victimization and risk for an

anxiety disorder in adulthood (OR 2.35, 95% CI, 1.01–5.50). If the ELBW survivor reported having an overprotective parent, peer victimization was associated with increased risk for having an anxiety disorder in adulthood (OR 2.45, 95% CI, 1.13–5.30). In contrast, this association was not significant in the absence of an overprotective parent (OR 1.04, 95% CI, 0.73–1.49). The separate associations are graphed in Figs. 2 and 3. While overprotective parenting was not a significant moderator when predicting an alcohol or substance use disorder, having an overprotective parent was associated with greater risk for these problems (OR 5.96, 95% CI, 1.08–32.83). Participant sex, familial SES and general functioning, and child total behavior problems did not significantly predict any anxiety disorder or any alcohol or substance use disorder.

**Table 1** Descriptive characteristics of participants at age 29–36 years

Characteristic	<i>M</i>	<i>SD</i>	Range
Birth weight (g)	826.60	133.21	560, 1000
Gestational age (weeks)	27.04	2.32	23, 34
Familial SES	3.11	0.91	1, 5
Family general functioning	20.55	5.01	12, 36
Peer victimization	4.99	1.87	2, 10

Characteristic	<i>n</i>	%	Range
Gender, male	31	38.30	0, 1
Child total behavior problems	31	38.30	0, 1
Overprotective parent	33	40.00	0, 1
Anxiety disorder	18	22.20	0, 1
Alcohol or substance use disorder	10	12.30	0, 1

Familial SES (1 = highest SES level, 5 = lower SES level)

## Discussion

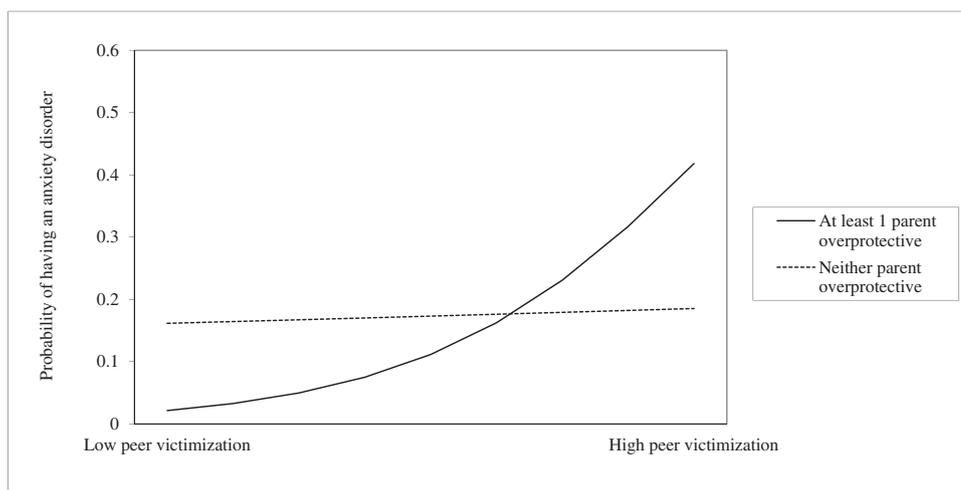
The aim of the current study was to investigate if overprotective parenting affected the strength of associations between experiencing peer victimization in childhood and/or adolescence, and the risk for an anxiety disorder or alcohol or substance use disorder at age 29–36. Despite our reduced sample size, as a result of attrition from following our participants from birth to age 29–36 years, we found that reporting having an overprotective parent moderated associations between self-reported peer victimization and risk for an anxiety disorder in adulthood, but not the risk for an alcohol or substance use disorder. If ELBW survivors reported having an overprotective parent, higher levels of peer victimization were associated with greater risk for an anxiety disorder in adulthood. If ELBW survivors did not

**Table 2** Associations between peer victimization, overprotective parenting, and psychiatric disorders in adulthood for ELBW participants

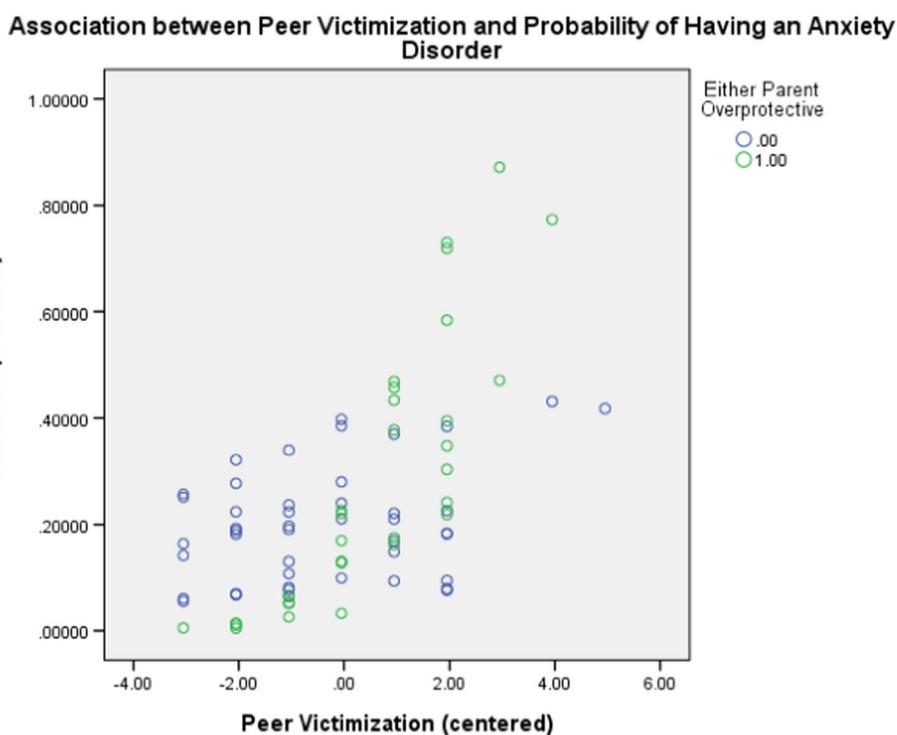
	Any anxiety disorder OR (95% CI)	Any alcohol or substance use disorder OR (95% CI)
1. Participant sex (male = 1, female = 0)	0.45 (0.12–1.70)	4.12 (0.85–19.94)
Familial SES (higher scores = lower SES)	0.95 (0.49–1.87)	1.36 (0.59–3.15)
Family general functioning (higher scores = poorer functioning)	1.05 (0.92–1.19)	0.98 (0.84–1.14)
Child total behavior problems (clinical levels = 1, non-clinical levels = 0)	2.12 (0.64–6.97)	0.54 (0.11–2.67)
2. Peer victimization <sup>a</sup>	–	0.81 (0.39–1.65)
Presence of overprotective parent	2.45 (1.13–5.30)	–
Absence of overprotective parent	1.04 (0.73–1.49)	–
Overprotective parent (presence = 1, absence = 0)	0.60 (0.12–2.96)	5.96 (1.08–32.83)
3. Peer victimization x overprotective parent	2.35 (1.01–5.50)	0.85 (0.36–2.00)

<sup>a</sup> There was a significant interaction with overprotective parenting for any anxiety disorder and the associations are reported separately for presence and absence of an overprotective parent. Overprotective parenting was reported by 34 (40%) participants, peer victimization was reported by 77 (92%) participants, anxiety disorders were diagnosed in 18 (21%) participants, and alcohol or substance use disorders were diagnosed in 10 (12%) participants

**Fig. 2** Association between peer victimization and the probability of having an anxiety disorder according to whether a participant reports none or at least one overprotective parent



**Fig. 3** Scatterplot for the association between peer victimization and the probability of having an anxiety disorder according to whether a participant reports none or at least one overprotective parent



report having an overprotective parent, the association between peer victimization and risk for an anxiety disorder was not statistically significant.

The combination of higher levels of peer victimization with an overprotective parent was associated with greater risk for an anxiety disorder in adulthood, but this association, while in the same direction, was not significant in the absence of an overprotective parent. It may be that the strongest effects are a result of the cumulative impact of both being victimized and having an overprotective parent, as they are both associated with greater risk for anxiety problems in adulthood (Edwards et al. 2010; Hudson and

Rapee 2001; McDougall and Vaillancourt 2015; Schwartz et al. 2015; Spokas and Heimberg 2009; Wood et al. 2003).

In contrast, overprotective parenting did not moderate associations between peer victimization and risk for an alcohol or substance use disorder in adulthood. This lack of a statistically significant interaction may be a result of the different pathways to anxiety and alcohol or substance use disorders. As ELBW survivors are already more likely to be shy and risk-averse (Schmidt et al. 2008; Waxman et al. 2013), peer victimization and overprotective parenting may have a stronger interaction when predicting anxiety than alcohol or substance use disorders.

Future research is needed in order to create and implement interventions that focus on parents of ELBW survivors (Jaekel 2016). The results of this study support previous assertions that while parents of ELBW survivors may feel the need to protect their children from harm, that it may be detrimental to children's long-term outcomes, especially in reference to anxiety problems in those exposed to peer victimization (Pyhälä et al. 2011). The combination of overprotective parenting and peer victimization may be detrimental to children's development, and so future research should investigate parental support and encouragement of children's independence as possible means for intervention to help ELBW survivors mitigate the negative effects of the combined exposures. Future research will also need to investigate how parents can best support their children born ELBW when bullying is found to occur, possibly by supporting their children, but also attempting to facilitate their pursuit of independence as a means of reducing their children's anxiety. Indeed, more work is necessary in order to better understand how to support the parents of preterm survivors so as to optimize their development and mental health across childhood, adolescence, and beyond.

### Limitations

As a result of following our ELBW survivors from birth to age 29–36 years, we did have a limited sample size. In regards to measurement, we included measures of peer victimization and overprotective parenting that were retrospectively reported at age 22–26 years. However, victims' reports of peer victimization have been found to be stable over time (Rivers 2001) and associated with victim status up to 7 years later (Olweus 1993). The PBI has also found to have relatively high test–retest reliability over a 10 year time span (Wilhelm and Parker 1990). Future research should investigate overprotective parenting, peer victimization, and psychiatric disorders with a prospective, longitudinal design. While our measure of peer victimization did take into account the frequency of peer victimization, it did not collect data on its chronicity, which has been found to be more strongly associated with psychopathology (e.g., Schreier et al. 2009). Future research should include a more detailed measure of peer victimization that includes chronicity of peer victimization. As both overprotective parenting and peer victimization were reported by the participant, it is possible that there was common-method variance as participants who reported being victimized may have been more likely to report an overprotective parent. As we did not include a measure of parental anxiety, it is possible that overprotective parenting is associated with anxiety and that there is a genetic or environmental predisposition to anxiety that may be triggered by experiencing

higher levels of peer victimization. In addition, as both overprotective parenting and peer victimization were reported by the participant, the findings are correlational and so the directions of relations are only hypothesized. As a result, the roles of overprotective parenting as a moderator and peer victimization as the independent variable are only hypothesized. A longitudinal study would be needed to attempt to untangle the processes by which these variables are associated. Peer victimization was measured with two questions, so more questions may be necessary to have a complete image of all of the bullying taking place. In addition, the sample was born in the late 1970s to early 1980s and neonatal care has improved in recent years, so these results should be replicated in a sample that has born more recently. Lastly, the sample was primarily Caucasian and born in a country with universal health care, and therefore generalizable mainly to populations with similar sociodemographics.

**Acknowledgements** Dr. Kimberly L. Day is now in the Department of Psychology at the University of West Florida. We thank the many participants and their families for their continued participation. We are also grateful to the following research staff from McMaster University: Nicole Folland, PhD, Paz Fortier, BA, Karen Mathewson, PhD, Sue McKee, BA, Barbara Stoskopf, RN, MHSc, Jordana Waxman, MSc, and Shirien Yunus, BSc, for their help with data collection and organizing the assessments.

**Author Contributions** K. L. D. analyzed the data and wrote the manuscript. L. A. S. designed and executed the study and collaborated with the writing and editing of the final manuscript and provided funding. T. V. collaborated with the writing and editing of the final manuscript. S. S. collaborated with the design and execution of the study and collaborated with the writing and editing of the final manuscript. M. H. B. collaborated with the writing and editing of the final manuscript. R. J. V. designed and executed of the study and collaborated with the writing of the final manuscript.

**Funding** This research was funded by Canadian Institutes of Health Research Grants CIHR: TMH-103145 (to Dr. Louis A. Schmidt) and CIHR: MOP42536 (to Dr. Saroj Saigal), National Institute of Child Health and Human Development Grant NICHD: 1-R01HD40219 (to Dr. Saroj Saigal), and a Lawson Post-Doctoral Fellowship (to Dr. Kimberly L. Day).

### Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no competing interests.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of McMaster University's and Hamilton Health Sciences' ethics committees and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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