Critical Review:
What Impact Do Adverse Childhood Experiences (ACEs) Have on Language Related Outcomes?

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This critical review examined the existing evidence of the impact that Adverse Childhood Experiences (ACEs) have on language related outcomes. An electronic literature search yielded six studies, which met inclusion criteria. Articles reviewed included expert information, cohort studies, meta-analyses, and a case-control study. The evidence gathered provides suggestive evidence that ACEs influence language related outcomes. However, the existing evidence is limited as the topic is an emerging area of interest. Strengths and limitations of the reviewed studies as well as clinical implications are included in this paper.

Introduction

Speech-Language Pathologists (S-LPs) specialize in providing support to children, families, and communities in the development of language. Language development includes both receptive and expressive language development. Receptive language is the ability to understand or comprehend language while expressive language is the ability to use language to convey messages to others (Frazier, 2011a, 2011b).

The process of language development begins in infancy and typically continues into adolescence (Polka, et al., 2007; Berman, 2007). The complexity of language development is due to the interaction between underlying psychological mechanisms and the child's environment (Shatz, 2007). Due to this interaction with the environment, it is essential for S-LPs to consider factors that may inhibit or impede a child's language development. Adverse Childhood Experiences, or ACEs, are one such factor for S-LPs to consider when delivering support for language development.

Adverse Childhood Experiences

A growing field of interest in the health sciences is on the impact of ACEs on child development and lifelong health outcomes. The original Adverse Childhood Experiences (ACEs) Study in 1998 presented a link between the breadth of childhood exposure to abuse, neglect, and household dysfunction and multiple health risk factors (Felitti et al., 1998). The category of exposure to abuse includes experiences of emotional, physical, and sexual abuse, the category of exposure to neglect includes emotional and physical neglect, while the category of household dysfunction includes witnessing violence against the mother, substance abuse in the household, mental illness in the household, parental separation or divorce, and having a household member incarcerated (Felitti & Anda, 2010). An individual can be assigned an 'ACE score' that reflects their exposure to adverse experiences prior to the individual's 18th birthday (World Health Organization, 2016). Felitti et al. found that the higher a person's ACE score is, the higher the person's risk is for "diseases and conditions that include ischemic heart disease and chronic lung disease" (1998).

The categories of ACEs either reflect potentially traumatic events or parts of the child's environment that undermines their sense of safety, stability, and bonding (Centers for Disease Control and Prevention, 2019). ACEs create a type of toxic stress in individuals that translates into a variety of physiological responses including increased heart rate, blood pressure, and stress hormones such as cortisol (Franke, 2014). These physiological effects can be toxic to developing brains (National Scientific Council on the Developing Child, 2014). Toxic stress can also increase the likelihood of developmental delays (National Scientific Council on the Developing Child, 2014). These delays may include cognitive effects that translate into attention problems, learning disorders, and poor school performance (Widom, 2000). A study by Coster & Cicchetti in 1993 indicated that the most likely and long-lasting developmental delay caused by childhood trauma is communication.

The field of research around ACEs is still a relatively new area of interest. Additional categories of ACEs are currently being studied that include urban indicators (discrimination based on ethnicity, experiencing bullying, living in foster care, witnessing violence, and living in an unsafe neighbourhood), caregiver military deployment, and experiencing natural disasters or war (Cronholm et al., 2015; Westby, 2018). At this time, no literature that investigated the relationship between these new categories of ACEs and language related outcomes were found. Further, the majority of the current literature surrounding the impact of ACEs on language related outcomes focuses primarily on abuse and neglect. For this reason, the authors of this critical review also included papers that focused on the effects of abuse and neglect on language related outcomes.

Objectives

The primary objective of this paper was to critically evaluate the existing literature that investigates the impact that ACEs have on language related outcomes. The secondary objective

is to provide clinical recommendations regarding the use of information regarding ACEs to inform practice for S-LPs.

Methods

Search Strategy

Articles related to the topic of interest were found by searching online databases, including Google Scholar, PubMed, and ProQuest, using the following keywords: (Adverse Childhood Experiences OR ACEs OR maltreated children OR neglect) AND (language development).

Selection Criteria

Studies were selected for inclusion if they explored the effects of Adverse Childhood Experiences or child maltreatment on language development or language related outcomes.

Data collection

The results of the literature search yielded two expert information articles (level 5 evidence), two meta-analyses (level 3 evidence), one cohort study (level 2b evidence), and a non-randomized clinical trial (level 2a evidence).

Results

Expert Information

Given that the field of ACEs and language related outcomes is emerging, expert opinions can provide valuable information to help S-LPs inform their practice. Limitations include author biases and lack of control of confounding factors (Burns et al., 2011). For this reason, expert opinion articles should be interpreted with discretion.

Westby (2018) provided an expert opinion that discussed information on the relevance of ACEs to SLPs. The author is an expert in the area with relevant publications and has presented nationally and internationally on the subject. In this paper, she provided a review of the current literature surrounding ACEs that would be clinically applicable to S-LPs. From this review, Westby provided recommendations for S-LPs to consider regarding clients with ACEs in their clinical practice. She suggests that S-LPs need to be aware that children on their caseload may have ACEs and that questions about ACEs need to be asked by the S-LP when obtaining the developmental history about the child. She also suggests that S-LPs are required to understand the socio-emotional-behavioural effects that trauma has as well as the interprofessional collaboration needed to support these children. Finally, the author suggests that SLPs should consider the difficulties of children whose mothers have experienced a high number of ACEs. These mothers may have challenges with their own ability to use language to express feelings, regulate behaviour, and engage in conversational exchanges.

The author of this article provides compelling information regarding considerations for S-LPs with regards to the high likelihood of having a child with ACEs on their caseload. A major limitation of this article is that there is a lack of evidence in the literature to support Westby's statements given the emerging nature of this topic.

Overall, this paper by Westby provides equivocal evidence on the relationship between ACEs and language related outcomes.

Segal & Collin-Vézina (2019) completed a brief informational review of the impact of ACEs on brain function, language skills and trauma-informed initiatives including school-based trauma-informed programs.

For the section of the article on the effects of ACEs on the brain, the authors cited reputable sources such as Constantine Tsigos to provide research on stress and its effects on the body and brain. Tsigos is considered an expert in the field and has spoken in more than 200 workshops internationally and has released publications in the discipline of the endocrinology of the stress response with over a thousand citations by other researchers. Drawing on this research, the authors made the following conclusion: children who have endured ACEs tend to have difficulty meeting academic and behavioural expectations within the classroom. Difficulties are a result of the effects on brain function for instance difficulty processing information related to changes of the primary auditory cortex.

In relation to the effects of ACEs on language skills Segal et al. (2019) only discussed the component of literacy in regards to language without any mention of the several other aspects of language (e.g. pragmatics or syntax). Throughout this discussion, the authors provided a limited amount of references to support their review of the effects of ACEs on language, as the authors only cited 3 articles. Additionally, the authors unreliably summarized the findings from Manly et al. (2013). The authors stated, "learning to read and write in English can be especially taxing for children with emotion regulation limitations, leading them to become overstimulated and unready to perform (Manly et al., 2013), thereby further negatively impacting their language development." However, emotional limitations were not found to be discussed in Manly et al. (2013).

Segal et al. (2019) also provided a review of school-based trauma-informed practices. These included teacher training initiatives (e.g. Healthy environment and Response to Trauma in Schools [HEARTS] model) which positively influenced students' school functioning such as student gains in managing behaviors, incidences of violence, and school attendance. The authors also supported the notion that trauma-informed practices such as trauma-informed language training can especially benefit students affected by ACEs due to the importance of language proficiency on later academic

functioning. Trauma-informed language training can aid the development of reflecting on the mental aspects of texts and responding to text events.

Some of the major limitations recognized are that trauma-informed initiatives are being implemented when children are in middle school, which could be delivered too late for some children as they may have experienced years of trauma. Developmental gains, including language, would be more profound if initiatives were implemented earlier.

This paper provides suggestive evidence on the impact of ACEs on the functioning of the brain as well as the benefits and limitations of trauma-based initiatives. The researchers provided equivocal evidence that ACEs affect the language related outcomes of literacy.

Meta-Analysis

Meta-analysis is a statistical technique that allows researchers to synthesize data from multiple studies (Ismail, 2016). The results of this type of analysis can provide one of the strongest types of evidence for answering research questions (Ismail, 2016).

Sylvestre et al. (2016) completed a meta-analysis to investigate whether children experiencing physical abuse and/or neglect have comparable language development to children who are not exposed to maltreatment. An electronic search was conducted to find articles using 6 databases with clearly defined eligibility criteria and search strategy (i.e. 2 groups of children ages 0 and 12). Two researchers investigated articles independently and data was extracted using a coding grid. Meta-analysis was conducted using the Comprehensive Meta-Analysis Version 2.0. There was also an assessment of the risk of cohort effects and bias within the studies found. Their search revealed 565 studies of which 21 were retained with 1420 total participants (sample sizes varying from 24-142). Reference lists allowed for the identification of an additional four articles of which only one article was retained.

Analysis of the data revealed a moderate and significant inverse association between physical abuse/neglect and language. Moderator variables (language, maltreatment subtypes, age of child and publication year) were analyzed to see whether they contributed to the differences between the language of maltreated and non-maltreated children. Results indicated that the age of the child and publication year provided significant moderating effects to the relationship between maltreatment and language. Suggesting that a stronger relationship between maltreatment and language was observed in younger children. Furthermore, more recent publication years indicated a larger negative effect size on maltreatment and language skills.

However, no significant differences were found between the subtypes of maltreatment. This means that language is affected regardless of abuse or neglect.

Limitations include a small study and sample size within the 22 studies (ranging from 24-142 participants). This could have resulted in a lack of statistical power which could account for the finding of no significant differences between subtypes of maltreatment. The review also mentioned that variance in data was not completely explained, suggesting that confounding variables could play a role in the association between abuse/neglect and language development (e.g. socio-economic status).

Overall, this review provided strong suggestive evidence that abuse and neglect affect language development when compared to children who have not experienced maltreatment.

Lum et al. (2015) completed a meta-analysis that summarized the relationship between maltreatment with respect to expressive and receptive language. An electronic search was conducted to find articles using four electronic databases with well-defined study inclusion criteria and search strategy (i.e. studies that examine language in a group of maltreated children). The authors used a modified version of the Newcastle-Ottawa Scale to ensure bias was reduced in relation to participant selection. Articles were investigated by three reviewers whose reliability was also assessed. Researchers included a flowchart that summarized the articles that were excluded from the reviewer's database search. From the 26,540 records identified during their search, 26 studies were found that met all four inclusion criteria. Data from the 26 articles were represented by 1179 maltreated children and 936 controls. Analysis of the data indicated that maltreated children demonstrated poorer language skills when compared with age-matched control groups. More specifically, when investigating performance related to standardized scores (mean= 100, SD= 15) maltreated children scored 13 points lower on expressive language skills and 8 points lower on receptive language skills.

The authors did not provide specific scores for receptive vocabulary and reported poorer performance by maltreated children compared to control groups. Furthermore, only two papers discussed the influence of maltreatment on expressive vocabulary, as a result, the authors did not report on these findings.

This study provides suggestive evidence that maltreated children may have difficulties with receptive and expressive language skills.

Cohort Study

Cohort studies are observational studies that follow a defined group of individuals over a certain period of time whereby the outcomes of two groups can be compared (LaMorte, 2016). A strength of retrospective cohort studies is that there is a clear temporal sequence between exposure to a variable and outcomes while limitations include poor data quality if the data was not designed to be collected for the current research question (LaMorte, 2016).

Jimenez et al. (2015) did a secondary analysis of data obtained from the Fragile Families and Child Wellbeing Study, a longitudinal birth cohort study of children from urban areas. From the data of this study, researchers investigated the relationship between the exposure to ACEs and teacher-reported outcomes that included language and literacy skills and emergent literacy skills in 1007 children. The participant's exposure to ACEs was obtained through maternal reports. Teacher reported outcomes were obtained through a 5-point Likert scale with "far below average" to "far above average" ratings for language and literacy skills and "not yet" to "proficient" ratings for emergent literacy skills. Through logistic regression analysis, researchers found that having just 1 ACE was associated with poor language and literacy skills as well as poor emergent literacy skills.

Limitations of this study include possible underestimation of the number of ACEs due to relatively high thresholds for standardized scales assessing child abuse behaviour and reliance on maternal reports. There was also a lack of reports on ACEs from the participant's fathers. Finally, this study only included data on 8 out of 10 ACEs (information on and parental divorce/separation was unavailable and emotional and physical neglect were characterized using a single measure as available data did not distinguish between the two).

Overall, this study provides suggestive evidence on the impact that ACEs have on language related outcomes that can have future impacts on academic success.

Case-Control Study

A case-control study is a type of non-randomized clinical trial where researchers define an outcome of interest, select subjects with and without the outcome, then look retrospectively at data to compare the two (Dupépé et al., 2019).

Eigsti & Cicchetti (2004) examined the syntactic abilities of maltreated vs. non-maltreated pre-school aged children using 33 mother-child dyads. The 19 participants from the maltreatment group were randomly selected from active caseloads of child protective social workers and had a mean age of 57 months, 20 days. The maltreatment of these participants was documented by Child Protective Services with onset prior to age two. The 14 participants from the comparison group had low socio-economic backgrounds similar to the maltreatment group and had a mean age of 59 months, 10 days. The study included video-taping 30-minute play sessions between mother-child dyads in a playroom stocked with age-appropriate toys with the mother being instructed to play with her child as she would at home. These play sessions were transcribed and coded without awareness of maltreatment status and after 10% of videotapes were transcribed for reliability, inter-rater reliability was K= .90. Outcomes were assessed by using the Index of Productive Syntax (IPSyn) to evaluate grammatical complexity, examining the production of auxiliary verbs in obligatory syntactic contexts, results of the Peabody Picture Vocabulary Test-Revised (PPVT-R), the number and type of maternal utterances, and maternal results on the vocabulary and comprehension subscales of the Wechsler Adult Intelligence Scales (WAIS).

Results indicated that the experience of child maltreatment was associated with language delay in both vocabulary and production of syntactic structures. It was also found that maltreating mothers were less talkative (regardless of their verbal abilities) and were less responsive to child-specific factors (e.g. maternal expansions and repetitions).

Limitations of this study include observations of the mother-child dyads only occurring in one setting (playroom at the research site) and syntactic knowledge was only measured through production, not comprehension.

Overall, this study provides strong suggestive evidence that S-LPs need to consider the impact of child maltreatment on language outcomes when working with vulnerable youth.

Discussion

The results from the literature suggest that ACEs influence language development and language related outcomes. However, evidence at this point is limited as ACEs are emerging in literature. As a result, evidence specifically related to ACEs are primarily expert opinions and observational designs (e.g. cohort and case-control studies). Literature surrounding maltreatment, neglect and abuse was referred to in order to obtain an in-depth understanding of how these components of ACEs affect language development.

The articles revealed suggestive evidence that children experiencing maltreatment have delays and difficulties in language development. This includes expressive and receptive language, vocabulary, and syntax (Lum et al., 2015; Eigsti & Cicchetti, 2004). Additionally, Sylvestre et al. noted no differences in language outcomes between abuse and neglect (2016). It is important to note that the concept of adversity is expanding to include adversities such as community-violence (Cronholm et al., 2015). As a

result, further research needs to explore the effects of these additional ACEs on language related outcomes.

It is also important to note that the only study that controlled for socio-economic status (SES) in this critical review was by Eigsti & Cicchetti (2004). The comparison and control groups (maltreated and non-maltreated) in this study were from a similar SES. It is crucial that research that investigates the impact of ACEs on language related outcomes controls for SES as maltreatment is often confounded with SES and SES has been found to be correlated with language differences. For this reason, a limitation of Sylvestre et al. study was the lack of control of this variable (2016).

Segal & Collin-Vézina (2019) discussed how trauma-informed initiatives can positively influence students' school functioning by training teachers to effectively respond to students' challenging behaviours and increase their engagement. Record-Lemon & Buchanan (2017) supported their discussion by stating that these initiatives can "mediate and address the psychological and developmental impacts of trauma such as attachment disruptions, PTSD, mental health concerns, and learning difficulties" (including language related outcomes). While there are several positive effects of trauma-informed initiatives, Segal & Collin-Vézina (2019) noted that these initiatives might be delivered too late as these children may have endured years of trauma. Although research surrounding the S-LPs role in trauma-informed initiatives is limited and emerging, at this time they can advocate for the implementation of these initiatives within the school board.

Clinical Implications

The results of this critical review provide suggestive evidence that ACEs have an impact on language related outcomes. This information suggests S-LPs should be cognizant of the effects of ACES on language. It also indicates that S-LPs have a role in supporting clients and families affected by ACEs. Such information should inform the way S-LPs conduct case history collection, assessments, and treatment. Increased knowledge of ACES and the toxic stress it creates can help SLPs understand and better approach their client's undesirable and challenging behaviours. S-LPs working with this vulnerable population should also be urged to provide and advocate for trauma-informed care and trauma-informed initiatives, as well as ensuring that clients with ACEs obtain appropriate referrals for support from other health-care professionals (e.g. psychologists). Finally, S-LPs should consider the role they have in helping caregivers mitigate the effects of the toxic stress response to ACEs. When providing family-centered therapy, S-LPs have the opportunity to teach caregivers to be a buffer to toxic stress by teaching them how to engage in more quality interactions with the child.

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