Towards causal explanations of language mechanisms behind emotion development

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Author Note

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Abstract

There is a growing body of evidence suggesting that language difficulties co-occur with social, emotional, and behavioural (SEB) difficulties in children (see St Clair et al., 2011; Levickis et al., 2018). However, the research literature has not yet uncovered the direct causal mechanisms behind this co-occurrence. To illustrate this, I will begin with an overview of key emotion theories that the existing co-occurrence studies have missed. I will then examine relevant language and emotion development research on the basis of (1) theoretical framework, (2) methodological rigour, (3) ecological validity of procedures, and (4) evidential value to real-world educational and clinical contexts. Finally, I will conclude with my reflection on the causality between language difficulties and SEB difficulties in children. To respect the preference of the communities I represent, I will use identity-first and emancipatory language (American Psychological Association, 2019; Bottema-Beutel et al., 2020; The Alliance for Inclusive Education, 2021) wherever applicable throughout this paper.

Keywords: language difficulties, emotion development, alexithymia, theory, causality

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Theories of Emotion

Contemporary emotional development research, including those that establish the co-occurrence of language difficulties and SEB difficulties (e.g., Bakopoulou & Dockrell, 2016; Griffiths et al., 2020), is still anchored by a classical assumption that “basic emotions” (i.e., happiness, sadness, fear, anger, disgust, and surprise) are easily recognised, and directly correspond to universal facial configurations and internal states (Widen, 2013). Relying on this narrow **theory of emotion recognition** diminishes the explanatory power of these studies because, as demonstrated by Barrett et al. (2019) in their comprehensive review, facial expressions lack specificity and consistency in signalling emotions. Moreover, it is unlikely that only six emotion categories that were established in English-speaking cultures can account for all facets of human emotions across all cultures. Hence, there is a need for a paradigm shift if we want to capture the crucial individual differences and cultural variations that exist when humans express and process emotions.

One promising avenue for such a paradigm shift is paved by Ruba and Pollak’s (2020) **developmental framework for emotion reasoning**. They characterise emotion reasoning as children’s ability to make adaptive inferences and predictions about other people’s emotion states and actions, through the use of contextual information, expressive behaviours, and their own learning history, in order to organise reasonable behavioural responses to such inferences about their social worlds. They theorise the development of this ability as the product of interdependent cascading processes that involve sensory maturity, attention, memory, ability to make predictions and inferences, motor development, and language learning. A child’s sensory maturity and attentional development determine the sufficiency of multimodal information (e.g., facial expressions, prosody, bodily gestures) they perceive in order to reason about others’ emotions. Both working memory and long-term memory

enable the child to flexibly infer and predict how to respond to the emotionally-relevant cues that they perceive. To facilitate a reasonable response, motoric abilities (e.g., reaching, walking) and inhibitory control are necessary. As the child matures, their language acquisition also helps them learn verbally-sophisticated ways of generating responses to other people's emotions (Ruba & Pollak, 2020).

In order to explain the co-occurrence of language difficulties and SEB difficulties in children, it is vital for studies to employ a plausible theory about the role of language in emotional development. An element for such a theory can be drawn from Gendron and Barrett's (2018) **Theory of Constructed Emotion (TCE)**, which posits that people use language to co-construct emotions as they engage in dynamic interactions. Underpinned by neuroscientific evidence (for an updated review, see Satpute & Lindquist, 2021), TCE centres language as the main driver for the synchronised and nuanced conceptualisations of people's experiences and perceptions of emotion. Implicitly, language (e.g., words for mental states) serves as an efficient means for initiating predictions about an emotion by activating prior conceptual knowledge that is relevant to a certain situation (Gendron & Barrett, 2018). Explicitly, language serves as an effective tool for directing attention, resolving ambiguity, communicating intentionality, organising shared experience, navigating cultural variations, understanding, and bridging subjectivity about emotions (Chen & Waxman, 2013; Gendron & Barrett, 2018). Most importantly, language affords people the ability to learn and navigate the cultural variations that create subjective meanings of emotion in our shared social reality (Gendron & Barrett, 2018).

Another element for a plausible theory of emotional development through language can be drawn from research on alexithymia (i.e., difficulty processing, identifying, and expressing one's own emotions). Compatible with Gendron and Barrett's (2018) TCE, Hobson et al.'s (2019) **Alexithymia-Language Hypothesis (ALH)** provides a convincing case about how language difficulties can cause alexithymia. ALH is conceived from extant research evidence involving alexithymic adult populations who were found to be generally less verbally-expressive (i.e., less expressive about emotions and other language-related domains) than non-alexithymic adults (Hobson et al., 2019). ALH also builds on existing research evidence involving patients with acquired language disorders (e.g., traumatic brain injury, language subtypes of frontotemporal dementia) who were found to exhibit disrupted emotional processes that lead to alexithymia. Hence, ALH makes a strong case that online or interactive linguistic mechanisms contribute to emotional processes throughout the human lifespan. In addition, ALH may have the capacity to predict developmental associations between alexithymia and specific language problems (e.g., Developmental Language Disorder or DLD), considering that SEB difficulties in children with DLD resemble how alexithymia mediates between emotional problems and language difficulties (Hobson et al., 2019).

Language and Emotion Development Research

Extant research literature on the co-occurrence of language difficulties and SEB difficulties in children has already established sufficient evidence to make the case that early language development is a primary indicator of child well-being (Law et al., 2017). Indeed, this research evidence corroborates the practice-based evidence that I have gained for seven years as a paediatric speech-language therapist in the Philippines. However, co-occurrence or correlational findings do not provide causal evidence (Altman & Krzywinski, 2015) that is necessary to directly explain the causal relationship between language difficulties and SEB difficulties. Co-occurrence does not provide clarity regarding the underlying mechanisms that are needed to better inform practitioners on how to effectively address children's difficulties in real-world practice. To demonstrate this, this section will critically evaluate pertinent language and emotional development research on the basis of (1) theoretical framework, (2) methodological rigour, (3) ecological validity of procedures, and (4) evidential value to real-world educational and clinical contexts.

St Clair et al. (2011) aimed to examine the longitudinal development of SEB difficulties in 234 children with a history of Developmental Language Disorder (DLD; formerly called Specific Language Impairment or SLI) in England at four time points from childhood to adolescence (i.e., at age 6:5-7:9, at age 8, at age 11, and at age 16). They found that for this cohort, emotional problems persisted and social problems increased in adolescence, and that SEB difficulties were generally related to pragmatic abilities (i.e., skills that rely on context to derive meaning from the dynamic interaction between language form and use). While their findings can be useful to show that language difficulties and SEB difficulties indeed co-occur, their study does not have a solid theoretical framework that can help uncover the language mechanisms behind SEB difficulties. Their study merely builds on prevalence studies of psychiatric disorders in children with DLD, and on simplistic conceptualisations of SEB difficulties, as evidenced by their use of the Strengths and Difficulties Questionnaire (SDQ). SDQ is a behavioural screening questionnaire that can be completed by informants (e.g., parents, teachers, or the child's peers aged 4-16) or as a self-report version by 11- to 16-year-old people (Goodman et al., 2003). The questions (e.g., "I worry a lot"; "I get very angry and often lose my temper") that SDQ asks do not capture the nuances of the social and behavioural dimensions of any given emotion that a child experiences at any given time and place. In St Clair et al.'s (2011) study, they relied on both teachers' reports and children's self-reports, which are relatively easy to administer for a longitudinal study but lack the nuances required to explain the linguistic mechanisms behind SEB difficulties. Hence, their findings are correlational at best.

Another investigation of SEB difficulties in children with DLD in England is a case-control study conducted by Bakopoulou and Dockrell (2016). In this study, they aimed to investigate the social cognition skills of 42 children with DLD (aged 8 to 11) in relation to their socio-emotional functioning.

These children were individually matched with 42 non-DLD children for chronological age and non-verbal cognitive ability, and with 42 younger children with DLD (aged 6 to 8) for receptive language ability. They concluded that language ability did not predict teacher-rated SEB difficulties for the DLD group, but their social cognition and prosocial behaviour skills did. However, similar to St Clair et al.'s (2011) study, they merely relied on SDQ's simplistic metrics of prosocial behaviour (e.g., "Helpful if someone is hurt, upset, or feeling ill") and SEB difficulties (e.g., "Picked on or bullied by other children"). In addition, their social cognition measures are underpinned by an outdated theory of emotion recognition, as evidenced by the experimental social cognition tasks they used. In their study, they measured social cognition by asking children to label, identify, infer, and resolve conflicts relating to four emotion categories (i.e., sadness, happiness, fear, anger) from a set of photographs, illustrations, and hypothetical stories. As I discussed in the preceding section of this essay, facial configurations lack specificity and consistency in signalling emotions (Barrett et al., 2019) especially when isolated from naturalistic contexts like what they did in this study. Moreover, children's social cognition skills are not confined to contexts of just four emotion categories. Therefore, Bakopoulou and Dockrell's (2016) claim that language does not predict SEB difficulties may only be applicable to the experimental conditions they set in their study.

In a more recent study, Levickis et al. (2018) aimed to improve our knowledge about language and SEB difficulties beyond clinical samples. They examined the developmental trajectory of 4- to 7-year-old children from a community sample of 771 families in Australia at three time points (i.e., at age 4, at age 5, and at age 7). They concluded that children with persistent language difficulties are indeed more likely to have co-occurring SEB difficulties. However, similar to the earlier discussed studies, this study also lacks a clear developmental theory that can help reveal the language-related mechanisms behind SEB difficulties. Moreover, their study's reliance on SDQ's simplistic conceptualisations of SEB difficulties does little in informing educators and health practitioners about how to effectively provide support to children. Hence, in the absence of causal mechanistic explanations between language difficulties and SEB difficulties, Levickis et al.'s (2018) community-based longitudinal study does not go beyond providing correlational evidence.

Of relevance to school-based practitioners (e.g., teachers, speech-language therapists), Blewitt et al. (2018) conducted a systematic review and meta-analysis of 79 experimental or quasi-experimental studies that evaluated the effectiveness of universal curriculum-based social and emotional learning (SEL) interventions delivered to children in early childhood education and care settings. The aggregated results of this review involve 18,292 children (aged 2 to 6 years) in Africa, Australia, Europe, Middle East, North America, and South America. They found that the children in SEL intervention conditions exhibited reduced behavioural and emotional challenges, as well as significant improvement in their social competence, emotional competence, behavioural self-regulation, and early learning outcomes.

Their meta-analysis generated the largest effect for measures of emotional competence, which may suggest that children's emotional development facilitates their social, behavioural, and learning outcomes. Their review also revealed that school-based SEL interventions may not be sufficient in addressing challenging behaviour and emotions, and that interventions delivered by specialists, facilitators, or researchers tend to be more effective than those that were delivered by classroom teachers. It is also worth noting that the SEL approaches underlying these interventions that Blewitt et al. (2018) reviewed involve language-dependent methods of explicit instruction such as play, small-group sessions, storytelling, singing, and role play. While this review did not explicitly analyse language-related measures that contribute to SEB development and/or difficulties, future studies can build on this review's findings to establish the overlooked linguistic mechanisms behind emotional development.

Learning from what the previous studies have missed and drawing on Gendron and Barrett's (2018) **Theory of Constructed Emotion (TCE)**, Griffiths et al. (2020) conducted a longitudinal population cohort study in order to test the hypothesis that language supports emotion recognition. They tested the language and emotion recognition skills of 369 children in England, which included 97 children with DLD, at two time points (i.e., at age 5-6 and at age 10-12). They concluded that these children's language skills, but not their non-verbal cognitive ability, at age 5-6 predicted their skills for recognising emotion from facial and vocal cues at age 10-12. While this study is anchored by a reasonable language and emotion theory (i.e., TCE), their reliance on the outdated theory of emotion recognition diminishes the evidential value of their findings. Their emotion recognition tasks required children to identify six emotion categories (i.e., happy, sad, scared, angry, surprised, disgusted) when presented with photo stimuli and sound stimuli that were artificially created by actors. As I previously mentioned in this essay's emotion theory section and in my discussion of Bakopoulou and Dockrell's (2016) study, people do not signal or understand emotions through facial expressions and even prosodic cues alone without the necessary context. Hence, Griffiths et al. (2020) uncovered a language mechanism behind recognition of the six emotion categories in their experimental conditions. However, this evidence may not generalise to children's emotion reasoning (refer back to the preceding section for a discussion) in real-world contexts.

Conclusion

This essay provided an overview of key emotion theories that I believe can contribute towards **building a plausible theory about the central role of language in emotional development**. The developmental element for such a theory can be drawn from Ruba and Pollak's (2020) developmental framework for **emotion reasoning**, which lays out the pitfalls of the classical theory of emotion recognition. The language mechanism element can be drawn from Gendron and Barrett's (2018) Theory of Constructed Emotion, which posits that **language enables people to co-construct emotions** as they

engage in dynamic interactions. To account for the linguistic mechanisms behind SEB difficulties throughout the human lifespan, an element can be drawn from Hobson et al.'s (2019) Alexithymia-Language Hypothesis, which postulates that **language difficulties can cause alexithymia**. I believe these are the theoretical frameworks that should underpin studies that aim to uncover the direct causal mechanisms between language difficulties and SEB difficulties. Unfortunately, such studies are not yet in existence.

As I demonstrated in the preceding section of this essay, both existing and contemporary research evidence from longitudinal cohort studies, experimental work, intervention studies, and systematic reviews are still correlational, and have not yet fully explained the linguistic mechanisms behind SEB difficulties. Indeed, these studies generated sufficient evidence that established the co-occurrence of language difficulties and SEB difficulties. However, they all lack solid theoretical frameworks that can capture the nuances of emotional development and the linguistic mechanisms behind it. In other words, none of these studies have the capacity to yield causal evidence because the ecological validity of their measures and procedures is not enough to fairly capture the nuances of children's language and emotional development in real-world contexts. Therefore, **the extent to which language difficulties directly contribute to social, emotional, and behavioural difficulties in children is still correlational**. This does not mean that any researcher or practitioner can definitively claim that language difficulties do not cause SEB difficulties, however. What it does mean is that future research has yet to generate robust causal evidence by learning from the pitfalls of extant studies.

Robust causal explanations will be needed to better inform practitioners on how to effectively address children's language and SEB difficulties in real-world educational and clinical contexts. To this end, one way forward is to develop plausible theories (see Guest & Martin, 2021) of linguistic mechanisms behind emotional development, before pursuing further empirical testing. Investment on the theoretical cycle (van Rooij & Baggio, 2021) of research can help avoid the common methodological issues faced by the existing studies in this area. In addition, most of the studies I reviewed in this essay were conducted in English-speaking and European countries, with the exception of 3 intervention studies from Africa, South America, and the Middle East in Blewitt et al.'s (2018) systematic review. Hence, it is likely that the findings and implications of these studies do not extend to more linguistically- and culturally-diverse populations around the world. Future researchers should then thoroughly think about how to address such epistemological, culturally-dependent, and methodological biases in language and emotional development research. Theory development and formal (i.e., computational or mathematical) methodologies (see Devezer et al., 2021) can offer rigorous and nuanced tools for such a vital endeavour.

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