Université de Montréal

Détection du trouble développemental du langage à la petite enfance en pédopsychiatrie : facteurs de risque et inquiétudes parentales

par Florence Valade

Département de psychologie
Faculté des arts et des sciences

Thèse présentée à la Faculté des études supérieures et postdoctorales
en vue de l'obtention du grade de Philosophiæ Doctor (Ph. D.)
en psychologie recherche et intervention
option psychologie clinique

Juillet, 2023

Université de Montréal

Département de psychologie, Faculté des arts et des sciences

Cette thèse intitulée

Détection du trouble développemental du langage à la petite enfance en pédopsychiatrie : facteurs de risque et inquiétudes parentales

Présenté par

Florence Valade

A été évalué par un jury composé des personnes suivantes

Geneviève Mageau

Présidente

Marie-Julie Béliveau

Directrice de thèse

Anne-Marie Nader

Membre du jury

Julie Leclerc

Examinatrice externe

Résumé

Le très faible pourcentage d'enfants d'âge préscolaire atteints de troubles mentaux qui accèdent à des services de santé mentale spécialisés est un problème majeur de santé publique, compte tenu notamment de la prévalence élevée et des répercussions négatives importantes des troubles mentaux chez les jeunes enfants. C'est particulièrement le cas pour le trouble développemental du langage (TDL) qui est associé à des difficultés d'apprentissage et psychosociales significatives pouvant perdurer jusqu'à l'âge adulte. La présente thèse s'intéresse aux composantes de la surveillance développementale pour soutenir la détection précoce du TDL à la petite enfance en contexte pédopsychiatrique. Son objectif est de mieux cibler les facteurs de risque et les inquiétudes rapportées par les parents qui distinguent le TDL des autres troubles mentaux au sein d'un échantillon d'enfant d'âge préscolaire consultant en pédopsychiatrie.

Le premier article vise à étudier les facteurs de risques propres au TDL, en les comparant aux autres troubles mentaux. L'acquisition des premières phrases après 24 mois, l'immigration maternelle et les antécédents familiaux de retard langagier ont été identifiés comme les prédicteurs les plus importants du TDL. De plus, les résultats montrent que les enfants atteints de TDL étaient exposés à un nombre significativement plus élevé de facteurs de risque que ceux atteints d'autres troubles mentaux. Le deuxième article explore la précision des inquiétudes parentales selon ses niveaux de sensibilité et spécificité ainsi que par sa valeur prédictive quant au diagnostic final des enfants. Les résultats ont démontré que les troubles du langage étaient mieux détectés par les parents que les autres troubles, tout en étant moins spécifiques, car ils pouvaient être associés à d'autres diagnostics que le TDL. Les inquiétudes parentales se sont avérées généralement fiables et pertinentes dans la détection de troubles mentaux dès l'âge

préscolaire, à l'exception de la sphère motrice, au sein de laquelle les difficultés des enfants étaient sous-détectées.

L'intégration des résultats des deux articles de la présente thèse montre qu'une meilleure connaissance et une utilisation plus efficiente des inquiétudes parentales ainsi que de facteurs de risque spécifiques lors des premiers stades du développement de l'enfant pourraient être déterminantes pour le pronostic du TDL, en se concentrant plus rapidement sur les interventions nécessaires et en s'assurant de la correspondance entre les besoins des familles et les services offerts.

Mots-clés : trouble mentaux, petite enfance, trouble développemental du langage, surveillance développementale, facteurs de risque, inquiétudes parentales

Abstract

The low percentage of preschool children with mental disorders accessing specialized mental health services is a major public health concern, given the high prevalence and significant negative impact of mental disorders in young children. This is particularly the case for developmental language disorder (DLD), which is associated with significant learning and psychosocial difficulties that can last into adulthood. This thesis focuses on the components of developmental surveillance to support the early detection of DLD in early childhood in a child psychiatric context. Its objective is to better target the risk factors and concerns reported by parents that distinguish DLD from other mental disorders in a sample of preschoolers consulting in child psychiatry.

The first article aimed to study the risk factors specific to DLD, by comparing them to other mental disorders. Acquisition of first sentences after 24 months, maternal immigration and family history of language delay were identified as the most important predictors of DLD. In addition, the results demonstrate that children with DLD were exposed to a significantly higher number of risk factors than those with other mental disorders. In the second article the levels of sensitivity and specificity of parental concerns were reported, as well as its predictive value for the final diagnosis of children. The results showed that language disorders were better detected by parents than other disorders, while being less specific, as they could be associated with other diagnoses than DLD. Parental concerns have proven to be generally reliable and relevant in the detection of mental disorders from preschool age, except for the motor sphere, in which children's difficulties were under-detected.

The integration of the results of our two articles demonstrates that a better knowledge and more efficient use of parental concerns as well as specific risk factors during the early stages of child development could be decisive for DLD prognosis, by focusing more quickly on the necessary interventions and ensuring the correspondence between the needs of families and the services offered.

Keywords : Mental Disorders, Early Childhood, Developmental Language Disorder, Developmental Surveillance, Risk Factors, Parental Concerns

Table des matières

Liste des figures

Article 1

Article 2

Liste des tableaux

Article 1

Article 2

Liste des sigles et abréviations

En français

FR	Facteur de risque
TDL	Trouble développemental du langage
TDC	Trouble développemental de la coordination
TDA/H	Trouble déficitaire de l'attention avec ou sans hyperactivité
TSA	Trouble du spectre de l'autisme
DI	Déficience intellectuelle

En anglais

RF	Risk Factor
CR	Cumulative Risk
MD	Mental Disorders
PC	Parental Concern
DLD	Developmental Language Disorder
DCD	Developmental Coordination Disorder
ADHD	Attention Deficit Hyperactivity Disorder
ODD	Oppositional Defiant Disorder
ASD	Autism Spectrum Disorder
ID	Intellectual Disability
CBCL	Child Behavior Checklist

Remerciements

J'ai eu la chance d'être très bien entourée tout au long de mes études doctorales. Aujourd'hui, je tiens à exprimer ma reconnaissance et ma gratitude immense envers tous ceux qui m'ont accompagnée dans ce parcours.

Tout d'abord, merci à ma directrice de thèse, Marie-Julie. Tu as cru en moi et tu m'as fait confiance, ce qui m'a permis de trouver ma voie dans l'univers fascinant de la recherche. Merci pour ta guidance et pour toutes les opportunités que tu m'as offertes, qui ont enrichi mon parcours doctoral. Je remercie également les membres du jury de ma thèse pour leur temps, leur expertise et leurs contributions précieuses à mon travail de recherche.

Merci à mes collègues de laboratoire pour nos échanges stimulants. Je remercie également toutes les personnes ayant collaboré à mes articles. À mes amies du doctorat avec qui j'ai partagé cette expérience unique, Émilie, Fannie, Karine, Martha-Émeline, Mira, Naïla, ainsi qu'à ma complice de bons restaurants, Dorothée, merci pour vos encouragements et votre solidarité.

Une mention toute spéciale pour ces femmes inspirantes avec qui je partage ma passion pour la psychologie et bien plus encore. Merci à Johémie, Alice et Laurine ; vous avez été à la fois source de stimulation par vos connaissances et source de réconfort par votre présence et votre écoute tout au long de mon cheminement. Je tiens également à remercier Vicki, une amie hors-programme qui m'a accompagnée et soutenue dans mon parcours. Merci également à toutes mes amies qui se sont intéressées à mes études.

Un remerciement tout particulier à David, mon conjoint. Ton amour et ton soutien sont d'une valeur inestimable dans ma vie. Notre complicité et nos moments de folie m'ont permis de rester positive même dans les moments difficiles. Merci pour ta patience et ta bienveillance tout au long de mon parcours mouvementé au doctorat.

Merci à ma sœur Elizabeth pour ta sensibilité, ton écoute et tes conseils pragmatiques lorsque nécessaire. Merci maman d'avoir soutenu ma curiosité et ma persévérance depuis mon jeune âge. Merci papa pour tes beaux encouragements et ton soutien. Votre amour et votre confiance ont été des moteurs puissants dans la réalisation de cette thèse et dans tout le parcours qui l'accompagne.

Introduction

Position du problème

Les problèmes de santé mentale touchent les enfants de tous âges, y compris les enfants d'âge préscolaire. En raison du nombre de changements développementaux intrinsèques à la période préscolaire, les parents et les praticiens de la santé peuvent considérer certaines difficultés comme normales ou transitoires. Or, la présence de difficultés de langage significatives en jeune âge est associée à des difficultés d'apprentissage (Rinaldi et al., 2023) ainsi qu'à des difficultés psychosociales apparentes au courant du développement (Conti-Ramsden et al., 2013) pouvant perdurer jusqu'à l'âge adulte (Conti-Ramsden et al., 2018; Elbro et al., 2011; Parsons et al., 2011). Puisque les compétences langagières jouent un rôle important dans le développement global de l'enfant, il importe d'améliorer le dépistage précoce de ces difficultés pour minimiser leurs conséquences ultérieures.

Le trouble développemental du langage (TDL), une pathologie du langage particulièrement prévalente à l'âge préscolaire (Norbury, 2016), a été davantage étudiée dans les travaux récents (Bishop et al., 2016). Les facteurs de risque (FR) associés au TDL restent méconnus en raison de précurseurs communs avec d'autres troubles mentaux de l'enfance et de l'absence de consensus quant à la définition du trouble (Bishop, Snowling, Thompson, & Greenhalgh, 2017). L'inquiétude parentale joue un rôle important dans la recherche de service et l'identification des enfants à risque (Sim et al., 2019). Ainsi, la préoccupation des parents face au langage de leur enfant pourrait contribuer à une détection plus efficace du TDL, favorisant un meilleur pronostic. L'amélioration de la détection précoce du TDL est donc nécessaire pour réduire les conséquences développementales importantes qui peuvent en découler.

Cette thèse permettra de documenter les facteurs de risque et les inquiétudes parentales dans un large échantillon d'enfants d'âge préscolaire référés en psychiatrie pour vérifier quels indices permettent de distinguer le TDL des autres troubles mentaux afin d'améliorer la détection précoce du TDL. En effet, différents diagnostics sont rarement comparés au sein d'une même étude, ce qui limite la précision et la portée des résultats obtenus. Par conséquent, des études menées sur des échantillons suffisamment importants d'enfants d'âge préscolaire consultants sont indispensables pour améliorer les connaissances sur les troubles de santé mentale en général ainsi que sur le TDL plus spécifiquement.

Trouble développemental du langage

L'acquisition du langage peut sembler être un processus naturel pour la majorité, mais il s'avère être un défi particulier pour plusieurs enfants. Les enfants qui éprouvent des difficultés significatives à acquérir le langage peuvent être considérés comme présentant un TDL.

Le TDL touche 7,58 % des enfants d'âge préscolaire, ce qui en fait l'un des troubles neurodéveloppementaux les plus répandus (Norbury et al., 2016). Néanmoins, il n'a pas été autant étudié que d'autres troubles à prévalence similaire, comme le trouble déficitaire de l'attention avec ou sans hyperactivité (TDAH; Bishop et al., 2012). L'incohérence dans les définitions du TDL à travers le temps peut avoir contribué à ce manque de sensibilisation (Bishop et al., 2016).

Le projet CATALISE, rassemblant un groupe international et interdisciplinaire de 57 experts, a établi un consensus sur l'utilisation de *trouble développemental du langage* comme terminologie recommandée en spécifiant ses critères diagnostics (Bishop et al., 2016; Bishop, Snowling, Thompson, Greenhalgh, et al., 2017). Selon ce consensus, le TDL se définit par des problèmes persistants de langage qui apparaissent dans la période développementale précoce et qui affectent la vie quotidienne de l'enfant en l'absence d'une condition biomédicale spécifique.

Le *Manuel diagnostic et statistique des troubles mentaux (5e éd., texte révisé)* (DSM-5-TR; American Psychiatric Association, 2022) réfère à cette pathologie par le terme *trouble de langage*, figurant parmi les troubles neurodéveloppementaux dans la catégorie des troubles de la communication, qu'il compose avec le trouble de la parole et de la phonologie, le trouble du bégaiement et le trouble de la communication sociale-pragmatique. Il se définit par « des difficultés dans l'acquisition et l'utilisation du langage consécutives à des déficits dans la compréhension ou la production du vocabulaire, dans la structure de la phrase et dans le discours », en spécifiant que « l'apprentissage et l'utilisation du langage dépendent à la fois de compétences réceptives et expressives ». Cette définition est conforme à la terminologie et aux critères préconisés par CATALISE, lesquels intègrent également la prise en compte des impacts fonctionnels chez l'enfant.

Sur le plan de la recherche sur les troubles langagiers, les critères d'exclusion utilisés ont varié et n'ont pas toujours fait consensus; la présence d'une atteinte non verbale ou d'un trouble neurodéveloppemental concomitant constituait par le passé dans la grande majorité des études un critère d'exclusion. Or, dans le DSM-5-TR, les critères d'exclusion ont été abolis en indiquant « qu'en présence d'un retard intellectuel, d'un déficit moteur affectant la parole, d'un déficit sensoriel ou d'une carence de l'environnement, les difficultés de langage doivent dépasser celles habituellement associées à ces conditions » (American Psychiatric Association, 2022). En ce sens, le consensus CATALISE propose de ne plus utiliser de critères d'exclusion pour définir les troubles du langage, et de documenter l'hétérogénéité des atteintes langagières. Or, lorsqu'un trouble du langage est associé à une condition biomédicale connue (p. ex., syndrome génétique, trouble du spectre autistique, déficience intellectuelle), il est recommandé de substituer le terme « développemental », qui désigne une étiologie incertaine, par « trouble du langage associé à X »

(Bishop et al., 2016). L'un des principaux objectifs de CATALISE était d'améliorer la reconnaissance du TDL, à travers le consensus terminologique mais également par la manière d'identifier les enfants ayant besoin d'une aide supplémentaire et spécialisée en matière de langage, ce à quoi la présente thèse contribuera.

Troubles mentaux à la petite enfance

Les troubles mentaux chez les jeunes enfants sont relativement fréquents. Une méta-analyse récente portant sur la prévalence internationale des troubles mentaux rapporte qu'un enfant sur cinq entre un et sept ans répond aux critères d'un trouble du DSM-5-TR; le trouble oppositionnel avec provocation (4,9 %), le TDAH (4,3 %) et les troubles anxieux (8,5 %) étant les troubles les plus courants selon cette étude (Vasileva et al., 2021), qui n'a toutefois pas documenté la prévalence du TDL.

Au cours de la dernière décennie, la problématique de l'accès aux services de santé mentale pour les jeunes enfants a suscité un intérêt croissant au sein de la littérature scientifique. Une méta-analyse regroupant les résultats de 21 études menées dans différents pays d'Amérique, d'Europe et d'Asie a conclu que seulement 26 à 42% des enfant d'âge préscolaire ayant été identifiés avec une problématique de santé mentale par un praticien de soins de première ligne ont été référés à des services spécialisés (Charach et al., 2020). Des résultats similaires issus d'une étude populationnelle longitudinale australienne ont rapportés que seulement 10 à 21 % des enfants de moins de six ans ayant obtenu des scores élevés au Child Behavior Checklist 1.5/5 years (CBCL 1 ½ - 5; Achenbach & Rescorla, 2000) ont eu accès à des services de santé, et qu'encore moins de ces enfants (0 à 16 %) ont eu accès à des services de santé mentale spécialisés. Des obstacles tels que le manque de reconnaissance des difficultés par les parents ont été identifiés (Oh et al., 2015).

L'écart entre la prévalence des troubles mentaux chez les jeunes enfants et l'accès aux services peut s'expliquer par la croyance erronée que ces enfants sont trop jeunes pour une évaluation (Alexander et al., 2013; Wakschlag et al., 2019). Une étude qualitative menée auprès de praticiens de la santé et de parents a révélé que, bien que les professionnels de la santé soient généralement bien informés sur les troubles mentaux chez les jeunes enfants, les parents sont moins susceptibles d'être conscients troubles mentaux en jeune âge et du besoin d'une intervention précoce (Alexander et al., 2013). Or, même lorsque les difficultés sont identifiées par les parents, des obstacles persistants à l'accès aux services subsistent, tels que le manque d'informations, le refus des professionnels d'intervenir, le manque de connaissances, la stigmatisation et l'indisponibilité des services (A. Hansen et al., 2021; Radez et al., 2021).

Au Québec, le programme *Agir tôt* a récemment été instauré dans le but d'identifier promptement les signes de difficultés développementales chez les enfants âgés de 5 ans et moins pour les orienter rapidement vers les services appropriés (Gouvernement du Québec, 2023). Cependant, au cours de la dernière année, des critiques ont été émises à l'égard de ce programme, mettant en lumière les délais d'attente excessivement longs pour les enfants nécessitant des services essentiels pendant une phase cruciale de leur développement (Cousineau, 2023). Il est à noter que le plus récent Plan d'action interministériel en santé mentale (2022-2026) ne semble pas aborder la nécessité d'améliorer ces services et ne fait aucune référence à des données ou actions spécifiques concernant les services destinés aux jeunes enfants (Gouvernement du Québec, 2022). Cette lacune souligne un manque de sensibilisation à l'importance de détecter précocement les troubles mentaux chez les jeunes enfants. Les obstacles persistants entravant l'accès aux services de santé mentale pour les jeunes enfants soulignent l'urgence d'une sensibilisation accrue, de la reconnaissance précoce des troubles mentaux et de l'amélioration des dispositifs de

soutien, afin de garantir un accès rapide et efficace aux services nécessaires dès les premières années de la vie.

Ces données sont d'autant plus préoccupantes considérant que la psychopathologie infantile s'avère assez stable (Bufferd et al., 2012; Halperin & Marks, 2019). En effet, la présence d'un diagnostic psychiatrique chez les enfants d'âge préscolaire a été associée à des problèmes importants durant l'enfance et l'adolescence (Briggs-Gowan et al., 2006; Dougherty et al., 2015). Cela est particulièrement le cas pour les troubles langagiers; les problèmes de langage précoces sont associés à des difficultés psychosociales et cognitives dont certaines sont susceptibles de persister à l'âge adulte, touchant des aspects du fonctionnement aussi divers que la réussite scolaire, l'intégration sociale, la santé mentale, l'acquisition de l'autonomie et l'accès à l'emploi (Conti-Ramsden et al., 2018; Elbro et al., 2011; Parsons et al., 2011). Ces impacts majeurs dans différents aspects du développement soulignent l'importance de se pencher sur les éléments permettant d'identifier précocement les difficultés langagières, plus spécifiquement le TDL, afin de mettre en place des services adaptés pour cette population à risque.

En outre, les études épidémiologiques sur les troubles mentaux documentent rarement la prévalence de troubles neurodéveloppementaux fréquents, tel que le TDL, ce qui peut contribuer au manque de sensibilisation au sujet de ces conditions au sein de la population et chez les professionnels de la santé. Les troubles neurodéveloppementaux apparaissent au cours de la période de développement et se caractérisent par des déficits qui entraînent des altérations du fonctionnement personnel, social, scolaire ou professionnel (American Psychiatric Association, 2013). Des études populationnelles ont identifié qu'environ 11 % des jeunes enfants sont diagnostiqués avec un trouble du développement (Chen et al., 2020; Zablotsky et al., 2019) mais ce taux atteint 55 % dans un échantillon clinique d'enfants référés en santé mentale (B. H. Hansen

et al., 2018). Les troubles neurodéveloppementaux sont souvent concomitants (American Psychiatric Association, 2013), mais la littérature scientifique a également identifié une forte cooccurrence entre les troubles neurodéveloppementaux et les problèmes émotionnels ou comportementaux, et ce, tant dans des échantillons épidémiologiques (Dougherty et al., 2015; Vasileva et al., 2021) que cliniques (B. H. Hansen et al., 2018; Wallisch et al., 2020). La présente thèse innovera en considérant la co-occurrence de différents troubles mentaux chez les enfants d'âge préscolaire consultant en clinique psychiatrique, ce qui est essentiel pour assurer une bonne adéquation entre les besoins des enfants et les services offerts (Youngstrom, 2013).

Facteurs de risque

Plusieurs troubles mentaux à l'enfance partagent les mêmes précurseurs (Mash & Hayden, 2014), ce qui complique l'établissement d'une relation claire entre certains FR et des troubles spécifiques. Dans le cas du TDL, le champ de recherche sur les FR est d'autant plus imprécis car les études se sont appuyées sur des domaines d'intérêt divergents : certaines mesurent le développement ou les difficultés du langage, à l'aide de test mesurant une capacité langagière spécifique (p.ex. : vocabulaire), d'autres, plus rares, sont composées d'échantillons d'enfants ayant reçu un diagnostic de TDL. Habituellement, les groupes cliniques sont comparés à des groupes contrôles sans diagnostic, plutôt qu'à d'autres groupes cliniques. Cela limite la compréhension du développement des troubles mentaux spécifiques. De plus, les études mesurent rarement plusieurs FR simultanément, notamment en raison de tailles d'échantillon insuffisantes. La disponibilité d'échantillons suffisamment larges d'enfants d'âge préscolaire consultant en clinique pour effectuer de telles analyses est rare. En effet, la plupart des échantillons sont de type populationnel ou de convenance, ce qui soulève d'importantes questions de validité écologique des résultats issus de telles études. La comparaison des FR entre différents diagnostics au sein

d'une même étude peut remédier à cette limite, puisqu'elle permet d'isoler des FR spécifiques à certains troubles mentaux. La présente thèse est novatrice et permet d'adresser cette limite importante dans la littérature scientifique en comparant les différents troubles mentaux entre eux. Documenter les facteurs de risque qui distinguent le TDL des autres troubles mentaux permettra de dépister plus précocement et d'orienter plus rapidement les jeunes à risque de présenter un TDL vers des services adaptés à leur besoin afin de favoriser un meilleur pronostic. Dès l'âge préscolaire, certains précurseurs ont été identifiés comme étant des FR pour le TDL.

Facteurs de risque personnels

Plusieurs FR personnels, tels que le sexe masculin de l'enfant, la naissance prématurée et le faible poids à la naissance ont été associé à des difficultés de langage, mais ils sont également identifiés dans d'autres études comme un risque de présenter d'autres troubles neurodéveloppementaux, comme un trouble du déficit de l'attention (TDAH), un trouble du spectre de l'autisme (TSA), une déficience intellectuelle (Hammer et al., 2017; Putnick et al., 2017b; Zablotsky et al., 2019) ou diagnostics de santé mentale, notamment la dépression, à la petite enfance (Wichstrøm et al., 2012). À l'heure actuelle, la littérature scientifique ne permet pas de déterminer si ces FR sont liés à la présentation de difficultés de langage, à une vulnérabilité à développer un trouble neurodéveloppemental ou à la psychopathologie en général. Les cliniciens utilisent les jalons développementaux comme indicateurs de nombreux troubles du neurodéveloppement tels que le TSA (Haque et al., 2021) et le syndrome de Down (Locatelli et al., 2021). La production de gestes, le vocabulaire ou la combinaison de mots ont été identifiés comme des prédicteurs précoces du TDL dans une revue de la littérature exploratoire récente (Sansavini et al., 2021). Cependant, d'autres études ont observé que les enfants ayant des retards langagiers ou moteurs avaient tendance à être ultérieurement diagnostiqués avec un TDAH

(Loughan & Perna, 2013; Shephard et al., 2022). Encore une fois, des études supplémentaires sont nécessaires pour déterminer si des retards dans l'acquisition de certaines étapes du développement ont une valeur prédictive spécifique pour le TDL. Il importe également de vérifier l'utilité de ces informations qui sont fréquemment colligées lors d'anamnèses développementales en pratique clinique.

Facteurs de risque familiaux

Plusieurs FR familiaux, comme le niveau de scolarité maternelle, l'âge maternel, les antécédents familiaux de problèmes de langage et le multilinguisme en milieu familial, sont associés au développement du langage chez l'enfant (AlHammadi, 2017; Hammer et al., 2017; McKean et al., 2015; Muluk et al., 2014). Dans le cas du multilinguisme, les liens entre un environnement familial multilingue et le développement du langage de l'enfant demeurent complexes à interpréter (Andersson et al., 2019). Par exemple, une revue systématique portant sur le multilinguisme et les troubles neurodéveloppementaux montre que les études ayant comparé des groupes d'enfants multilingues à des groupes monolingues présentant des troubles neurodéveloppementaux similaires n'identifient aucune différence sur le plan du développemental du langage entre les deux groupes (Uljarević et al., 2016), ce qui suggère que le multilinguisme ne soit pas un FR permettant de distinguer des groupes cliniques. La scolarité parentale, comme composante du statut socioéconomique familial, est associée au développement du langage et à la psychopathologie infantile en général (Peverill et al., 2021). En outre, la monoparentalité est un FR pour les troubles du langage (Brignell et al., 2018; Sim et al., 2019), mais également pour d'autres troubles mentaux dans les années préscolaires (Wichstrøm et al., 2012). Ces informations familiales sont aussi habituellement recueillies lors d'évaluations

développementales et il est essentiel de clarifier leur plus-value afin d'optimiser leur utilisation en pratique clinique.

À la lumière de la littérature scientifique actuelle, seuls la scolarité maternelle (Rudolph, 2017), l'ordre de naissance de l'enfant (Diepeveen et al., 2017), les antécédents familiaux de difficultés langagières et l'acquisition ultérieure de jalons langagiers (Sansavini et al., 2021) ont été identifiés comme FR par les études qui s'intéressaient au TDL, tel que défini par les critères CATALISE. Toutefois, la plupart de ces résultats ont été obtenus dans des échantillons populationnels au sein desquels la comparaison entre les différents diagnostics n'est pas prise en compte. Ainsi, leur capacité à prédire spécifiquement le TDL demeure imprécise, car aucune de ces études n'a comparé des groupes cliniques dans leur devis de recherche. La faible convergence des données concernant les FR associées au TDL souligne entre autres l'importance de définir clairement le type de pathologie du langage étudié pour générer des conclusions plus précises.

La notion quantitative des FR est également à considérer; l'exposition multiples à des FR personnels et familiaux est associée à des retards dans le développement du langage dans plusieurs études (Campbell et al., 2003; Reilly et al., 2010; Stanton-Chapman et al., 2004). Bien que plusieurs études abondent en ce sens, il demeure nécessaire de répliquer ces résultats dans des échantillons cliniques avec des enfants présentant diverses problématiques afin de déterminer si la notion de risque cumulé est associée au développement du langage ou à la santé mentale de manière plus générale à l'âge préscolaire.

En complément aux FR, l'inquiétude parentale pour le langage de l'enfant s'est avérée être un indicateur significatif des troubles langagiers chez les jeunes enfants dans une vaste étude populationnelle (Korpilahti et al., 2016). Ces résultats laissent présager que les préoccupations

parentales peuvent jouer un rôle important dans la détection précoce de certains troubles mentaux, et plus spécifiquement dans la détection du TDL.

Inquiétudes parentales

La pertinence de l'inquiétude parentale

La recherche de services pour les jeunes enfants dépend fortement de la préoccupation des parents concernant leur développement (Horwitz, Irwin, et al., 2003; Skeat et al., 2014). En cohérence avec des études suggérant que les parents fournissent des informations importantes sur les difficultés de leur enfant (Chung et al., 2011; Deakin-Bell et al., 2013), l'American Academy of Pediatrics (2020) recommande aux praticiens de considérer les inquiétudes des parents concernant le développement de leur enfant dans leur processus d'évaluation.

L'inclusion des inquiétudes parentales dans les soins pédiatriques s'insère dans une philosophie de collaboration entre les équipes soignantes et les parents. Cette approche centrée sur la famille comprend une relation de partenariat positive entre les praticiens et les parents, un dialogue éclairé sur la prestation des soins de santé et ainsi que des évaluations et de la surveillance régulières (Farnesi et al., 2012; Franck & O'Brien, 2019). En effet, lorsque les services s'éloignent de ces principes directeurs, les parents décrivent une plus grande insatisfaction à l'égard des soins et une probabilité plus faible de rechercher des soins futurs (Farnesi et al., 2012). Ces résultats soulignent qu'il importe de considérer les perceptions parentales dans le processus d'évaluation des troubles mentaux ainsi que dans les étapes subséquentes afin d'engager les parents dans les soins et de favoriser l'adhérence au traitement. Documenter les inquiétudes parentales peut donc également bonifier les connaissances sur l'approche centrée sur la famille dans les services de santé mentale à la petite enfance.

La portée de l'inquiétude parentale dans la détection des troubles mentaux

Certaines caractéristiques sont suspectées d'influencer la sensibilité et la spécificité de l'inquiétude parentale dans le cadre de la détection des troubles mentaux à l'âge préscolaire. La sensibilité décrit le pourcentage d'enfants avec un diagnostic correctement identifiés par une mesure, tandis que la spécificité décrit le pourcentage d'enfants sans diagnostic correctement identifiés par une mesure (Trevethan, 2017). L'American Academy of Pediatrics (2006) recommande que les instruments de dépistage du développement maintiennent des taux de sensibilité et de spécificité supérieurs à 70 %.

Chia-Ying Chung et al. (2011) ont rapporté que les préoccupations parentales, en particulier concernant le développement du langage et de la motricité, étaient de bons prédicteurs de retard de langage ou de motricité, présentant des taux de sensibilité variant de de 81 % et 83 % et de spécificité entre 94 % et 86 %, respectivement chez les enfants âgés d'un à quatre ans consultant en pédiatrie. D'autres préoccupations parentales, telles que celles liées à l'attention ou à l'hyperactivité, se sont avérées moins prédictives d'un problème réel dans un échantillon populationnel (Ford et al., 2005).

Les études sur l'utilité des inquiétudes parentales dans la détection des troubles mentaux à l'âge préscolaire se concentre principalement sur les enfants atteints de diagnostics spécifiques. La plus grande majorité traite du TSA (Tran et al., 2021; Zablotsky et al., 2018), des troubles de la communication Smolla et al., 2018) ou des problèmes comportementaux (Godoy et al., 2014), mais très peu d'études ont examiné la valeur distinctive des préoccupations parentales entre les troubles. Une étude de Wallisch et al. (2020) indique que les inquiétudes parentales précédant une évaluation diagnostique varient de manière significative en fonction du diagnostic établit et que les inquiétudes parentales correspondent aux critères diagnostics des troubles mentaux

diagnostiqués subséquemment. Toutefois, l'échantillon de cette étude est principalement formé d'enfants ayant reçu un diagnostic de TSA et ces enfants composent le groupe de comparaison principal de l'étude, ce qui limite la portée des résultats obtenus. À la lumière de ces résultats, le rôle du type de difficultés expérimentés par l'enfant sur la valeur prédictive des inquiétudes parentales demeure à préciser au sein d'échantillons de jeunes enfants présentant une plus grande variété de troubles mentaux.

La validité des préoccupations parentales peut également être influencée par l'âge de l'enfant ; Glascoe (2003) a rapporté que la précision des inquiétudes parentales comme indicateur de l'état de santé mentale réel des enfants est plus faible chez les enfants de moins de 4 ans et demi (sensibilité = 68 % ; spécificité = 66 %) par rapport aux enfants plus âgés (sensibilité = 87 % ; spécificité = 79 %). Cependant, Smolla et al. (2015) ont rapporté des valeurs plus élevées pour la sensibilité (88,5 %) et la spécificité (91,5 %) de l'inquiétude parentale concernant le langage dans un échantillon clinique d'enfants âgés de 3 à 5 ans. En outre, les résultats d'une vaste étude populationnelle écossaise révèlent que les inquiétudes parentales concernant des difficultés de langage et de comportement à l'âge préscolaire sont des indicateurs fiables des difficultés de l'enfant à l'âge de 6 ans. Les auteurs suggèrent que ces préoccupations parentales peuvent jouer un rôle crucial dans l'identification précoce de difficultés, et dans l'intervention subséquente, afin de limiter les conséquences négatives sur la santé, le développement, le comportement et la réussite éducative de l'enfant. Cette même étude identifie en complément des FR qui contribuent significativement aux résultats défavorables du fonctionnement de l'enfant à 6 ans (Sim et al., 2019), suggérant que les inquiétudes parentales et les FR doivent être considérés dans la détection précoce des difficultés de langage et de comportement.

Dans la littérature actuelle, les inquiétudes parentales pour le langage et le comportement ont été identifiées plus fréquemment comme des indicateurs de difficultés significatives chez l'enfant à l'âge préscolaire que des inquiétudes relatives à d'autres sphères du fonctionnement. Les résultats indiqués précédemment soulignent toutefois un manque de consensus concernant l'impact de l'âge et du type de difficultés expérimentées par l'enfant sur la validité des mesures de préoccupations parentales. Par conséquent, une étude permettant de comparer ces variables au sein d'un échantillon clinique est primordiale pour bien planifier et organiser les services en lien avec les besoins des enfants consultants.

Une démarche de détection intégrée

La surveillance développementale est le processus continu de suivi du développement, d'identification des facteurs de risque et de considération des préoccupations parentales. Elle est considérée par le Groupe d'étude canadien sur les soins de santé préventifs (2016) et par l'American Academy of Pediatrics (2020) comme un élément de la pratique clinique standard auprès des populations infantiles. Il importe toutefois de se pencher sur la manière d'optimiser la surveillance développementale afin de mieux orienter les familles dans leur trajectoire de soins vers les services adaptés pour soutenir la démarche diagnostique. La présente thèse s'intéresse donc aux composantes de la surveillance développementale, soit l'identification de facteurs de risque et les inquiétudes parentales, afin de bonifier l'utilisation de ces indicateurs pour soutenir la détection précoce du TDL à la petite enfance. Certains auteurs appuient cette idée en introduisant l'utilisation d'algorithmes dans l'évaluation diagnostique afin de considérer l'ensemble des facteurs susceptibles de contribuer au développement de troubles mentaux spécifiques et de favoriser une meilleure démarche médicale intégrée (Youngstrom, 2013).

Objectifs et hypothèses

La présente thèse s'insère dans un objectif général de détection précoce des troubles de santé mentale. Elle contribuera à l'identification d'éléments spécifiques pouvant optimiser la détection de troubles mentaux ainsi que soutenir la démarche diagnostique chez les enfants d'âge préscolaire référés en pédopsychiatrie. Sur le plan théorique, elle permettra de déterminer si les groupes cliniques se distinguent entre eux ou non, à partir des critères identifiés. Plus spécifiquement, la présente thèse se décline en deux volets subséquents et complémentaires; elle permettra de départager les FR et les inquiétudes rapportées par les parents qui distinguent le TDL des autres troubles mentaux afin de planifier et d'organiser adéquatement les services en cohérence avec les besoins des jeunes enfants qui consultent en santé mentale.

Le premier article examine les FR qui distinguent la présence ou l'absence de TDL, et la quantité de FR auxquels les enfants atteints de TDL sont exposés, par rapport aux enfants atteints d'autres diagnostics. Conformément à la majorité des études antérieures, il était attendu qu'un rang de naissance plus tardif, qu'un plus faible niveau de scolarité maternelle, que la présence d'antécédents familiaux de retard de langage et que l'acquisition tardive des premiers mots et des premières phrases distinguent les enfants diagnostiqués avec un TDL des enfants avec d'autres diagnostics dans notre échantillon clinique. L'hypothèse selon laquelle le nombre de FR est plus élevé chez les enfants TDL, par rapport aux enfants cliniques non-TDL, était également vérifiée. Cet article est publié dans *Clinical Child Psychiatry and Psychology*.

Le deuxième article vise à documenter la sensibilité et la spécificité de différents types d'inquiétudes parentales et à déterminer si des diagnostics spécifiques sont prédits par des inquiétudes parentales spécifiques en contrôlant pour l'âge de l'enfant. Il était attendu que les inquiétudes parentales concernant le langage et le comportement aient une meilleure sensibilité et

spécificité que des inquiétudes parentales portant sur d'autres sphères du développement de l'enfant et que chaque diagnostic soit prédit par l'inquiétude parentale correspondante. L'impact de l'âge de l'enfant sur cette prédiction était mesuré de manière exploratoire, compte tenu des résultats divergents rapportés dans la littérature scientifique concernant cette variable. Cet article a été soumis à la revue *Early Child Development and Care* le 27 novembre 2023. Il est en processus de révisions après son acceptation conditionnelle le 6 mars 2024.

Article 1

Titre

Individual and cumulative risk factors in developmental language disorder: A case-control study

Contribution des auteurs

Florence Valade : Revue de la littérature, conceptualisation de l'étude, collecte de données, analyses statistiques, interprétation des résultats et rédaction du manuscrit.

Marie-Julie Béliveau : Conceptualisation de l'étude, interprétation des résultats et révision du manuscrit

Chantale Breault : Collecte de données et révision du manuscrit

Benjamin Chabot : Collecte de données et révision du manuscrit

Fannie Labelle : Collecte de données, analyses statistiques et révision du manuscrit

Valade, F., Béliveau, M-J., Breault, C., Chabot, B., Labelle, F. (2022). Individual and cumulative risk factors in developmental language disorder: A case-control study. Clinical Child Psychology and Psychiatry, 28, (1),398-414. doi:10.1177/13591045221113389

Individual and Cumulative Risk Factors in Developmental Language Disorder: A Case-Control Study

Abstract

Many mental disorders (MD) share common etiology, fuelling debates about the specificity of clinical categories and whether the presence of specific risk factors (RF) can distinguish among them. The study of developmental language disorder (DLD), more specifically, has been further hindered by a lack of consensus regarding its definition. These limitations increase the risk of under-detection and lifelong consequences for affected children.

This paper aims (1) to document which individual RF allow differentiating DLD from other MD and (2) to compare the cumulative RF between children with DLD versus other MD.

This case-control design study used medical records of a psychiatric sample of 795 preschoolers (mean age 4:11, 75% boys). A logistic regression measured the predictive value of potential RF on DLD. Later first sentences, maternal immigration and family history of language delay were identified as significant in explaining 30% of the variance for DLD diagnosis. An ANCOVA revealed that children with DLD were exposed to a significantly higher number of RF than were children with other MD.

Public health policies informed with the knowledge of specific RF associated with DLD, and their cumulative impact, could improve early detection and reduce the cascade of negative consequences associated with DLD.

Keywords

Preschool children, child psychiatry, developmental language disorder, risk factors, cumulative risk, clinical study, case-control study, mental disorders

Introduction

Many children struggle with language development in their first years of life. While some overcome their difficulties, about 7.5% of the population will be diagnosed with a developmental language disorder (DLD; Norbury et al., 2016). DLD has repeatedly been associated with psychosocial and cognitive difficulties, which are likely to persist throughout adulthood (Conti-Ramsden et al., 2018; Parsons et al., 2011). Unfortunately, the lack of research attention and public health awareness about this phenomenon may have led to a high percentage of undetected cases of DLD among children consulting for emotional and behavioural problems (Hollo et al., 2014). This could in turn lead to an unfortunate cascade of developmental consequences for children with DLD. Improving its early detection may help ensure that children are provided with appropriate treatment and that they are oriented to language services at a time when they are most beneficial because of neural plasticity (Capone Singleton, 2018).

Mental disorders (MD) are generally characterized by a combination of abnormal thoughts, perceptions, emotions, behaviours, and relationships with others (World Health Organization, 2013). According to the World Health Organisation (2013), MD include depression, bipolar disorder, schizophrenia, dementia, as well as behavioural and developmental disorders with onset occurring in childhood. The authors of a recent meta-analysis (Vasileva et al., 2021) pointed out that while the overall MD prevalence in young children is of 20.1%, this field of research is neglected. DLD is even less known than other MD with similar prevalence, such as attention deficit / hyperactivity disorder (ADHD; Bishop et al., 2012).

Many challenges have hindered the study of DLD. First, several different terms and definitions have been used in the past to designate children with language difficulties, giving rise to significant obstacles in interpreting relevant literature, reconciling disparate results or

generating conclusions. A coherent perspective on language problems is also blurred because studies have been conducted on general language development, delays or impairment. For that reason, the CATALISE project assembled an international and interdisciplinary group of 57 experts in order to reach consensus on the terminology to use. This work led to the adoption of the term developmental language disorder to designate persisting language problems that affect everyday life in the absence of biomedical conditions such as intellectual disability (ID) or autism spectrum disorder (ASD; Bishop et al., 2016). This definition will be used in the present paper.

Additionally, risk factors (RF) associated with DLD may remain misunderstood because of common precursors among childhood MD (Mash & Hayden, 2014). Shared etiology has fuelled debates about the specificity of clinical categories, and it remains unanswered whether the presence of specific RF can distinguish between MD. Identification of specific markers could allow for an earlier detection of DLD and for appropriate interventions, therefore improving later outcomes and prognosis. Unfortunately, clinical groups are generally compared to controls, rather than other clinical groups. This limits the comprehension regarding the development of specific MD, raising doubts as to the scientific validity of clinical categories (Caron & Rutter, 1991). Moreover, different MD are not only rarely compared within the same study, but studies also seldom include several RF simultaneously, notably because of insufficient sample size. Furthermore, most samples are population-based or convenience-based, raising important ecological validity issues. Studies conducted on large enough samples of consulting preschoolers are much needed to improve knowledge on MD in general and DLD more specifically.

Building on the recent CATALISE consensus, this case-control study will allow documenting individual and cumulative RF in a large sample of preschoolers referred in psychiatry to verify whether they can distinguish DLD from other MD.

Which Early Life Risk Factors Are Associated with DLD?

Personal risk factors. is one of the most common RF for presenting a language deficit in early childhood in community-based and population-based samples (Brignell et al., 2018; Hammer et al., 2017), as well as for presenting many other MD, such as ADHD and depression (Cree et al., 2018; Wichstrøm et al., 2012). It remains unknown whether male gender is a specific RF for DLD or for suffering from mental health problems in general.

Perinatal difficulties have been identified as RF for language delays in early childhood in a population-based study (Putnick et al., 2017a), but not for DLD in a case-control study (Diepeveen et al., 2017). Perinatal difficulties are also strongly associated with ASD and ID, which both include language delays (Schieve et al., 2015). Therefore, it is currently unknown whether this RF is associated with presenting a language delay, a vulnerability to developing a neurodevelopmental disorder in general, or a DLD specifically.

Clinicians use developmental milestones as indicators of many neurodevelopmental disorders (Bellman et al., 2013). A scoping review reports that delays in gesture production, vocabulary or word combination emerged as early predictors of DLD (Sansavini et al., 2021). Yet, other studies observed that children who suffered language or motor delays were likely to subsequently be diagnosed with ADHD (Loughan & Perna, 2013; Shephard et al., 2022). More severe neurodevelopmental disorders such as ASD (Haque et al., 2021) and Down syndrome (Locatelli et al., 2021) are also screened from developmental milestones. Again, further studies are necessary to determine if delays in the acquisition of developmental milestones have a specific predictive value for DLD.

Familial Risk Factors. Lower maternal education has been linked to DLD (Rudolph, 2017) and to pathological language development in several studies (Hammer et al., 2017;

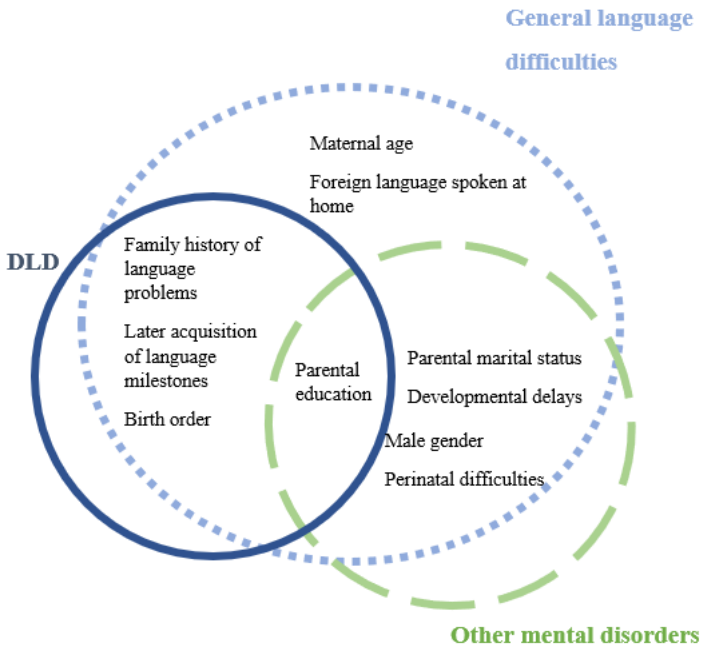
McKean et al., 2015; Muluk et al., 2014). Both the younger (Muluk et al., 2014) and older age of the mother (Hammer et al., 2017) have been identified as risks for language difficulties.

Having a single parent was identified as a RF for language impairment (Brignell et al., 2018), and for other MD in the preschool years (Wichstrøm et al., 2012). As for family rank, being a younger sibling was associated with DLD (Diepeveen et al., 2017). Family history of language problems has often been documented as a major RF for DLD, which was confirmed in a recent scoping review (Sansavini et al., 2021). Yet, this RF also predicts child language development in general (AlHammadi, 2017) which can be delayed in other MD such as ID or ASD.

Foreign language spoken at home has been identified as a RF for language impairment (McKean et al., 2015), but links between multilingual environment and language development are complex to interpret (Andersson et al., 2019).

Figure 1 summarizes the RF associated with DLD and/or with other clinical presentations. The poor convergence in data underlines the importance of clearly defining the type of language pathology studied to generate more specific conclusions. Maternal education, child's birth order, family history of language difficulties and later acquisition of language milestones have been identified as RF for DLD. Most of these results were obtained in community-based and population-based samples in which comparison between diagnoses are not considered. Thus, it is unclear whether these RF predict specifically DLD, since none of these studies compared clinical groups within their study design.

Figure 1. Venn diagram of shared and individual risk factors for developmental language disorder, general language difficulties and other mental disorders



What about Cumulative Exposure to Risk?

Robust findings suggest that multiple risk exposure has worse developmental consequences than single exposure (Sameroff, 2006). According to the neurophysiological model of allostatic load (McEwen & Stellar, 1993), having to deal with several RF undermines a system, which must adapt on several fronts. Multiple risk exposure was associated with language pathological development in infants from a predominantly low socioeconomic status population (Stanton-Chapman et al., 2004). However, the cumulative risk model of development has not yet been applied to the study of DLD. The present study will therefore include a cumulative risk index to verify whether clinical children diagnosed with DLD show more adversity than other clinical children.

The Current Study

This case-control study has two purposes: it aims to verify, within the medical records of a psychiatric clinic-referred sample of preschoolers, (1) which risk factors (RF) allow distinguishing between DLD and other mental disorders MD, and (2) if children diagnosed with a developmental language disorder (DLD) are exposed to a higher number of RF in comparison to children with other MD.

For the first objective, the respective prediction of personal and familial RF will be verified. Child's personal RF considered are gender, perinatal conditions (childbirth difficulties and gestational age) and age of acquisition of developmental milestones (acquisition of first words, first sentences, first steps, independent eating, and toilet training). Familial RF are maternal education, maternal age, maternal country of birth, foreign language spoken at home, parental marital status, family history of language delays, and child's birth order. Across these fifteen factors, only five were previously documented to be specifically associated with DLD. Thus, we hypothesize that these characteristics will predict DLD diagnosis in our clinical sample. Therefore, it is expected that (1) later birth order (2) lower maternal education, (3) presence of family history of language delay and later acquisition of (4) first words and (5) first sentences will distinguish children diagnosed with DLD from children with other diagnoses in our clinical sample.

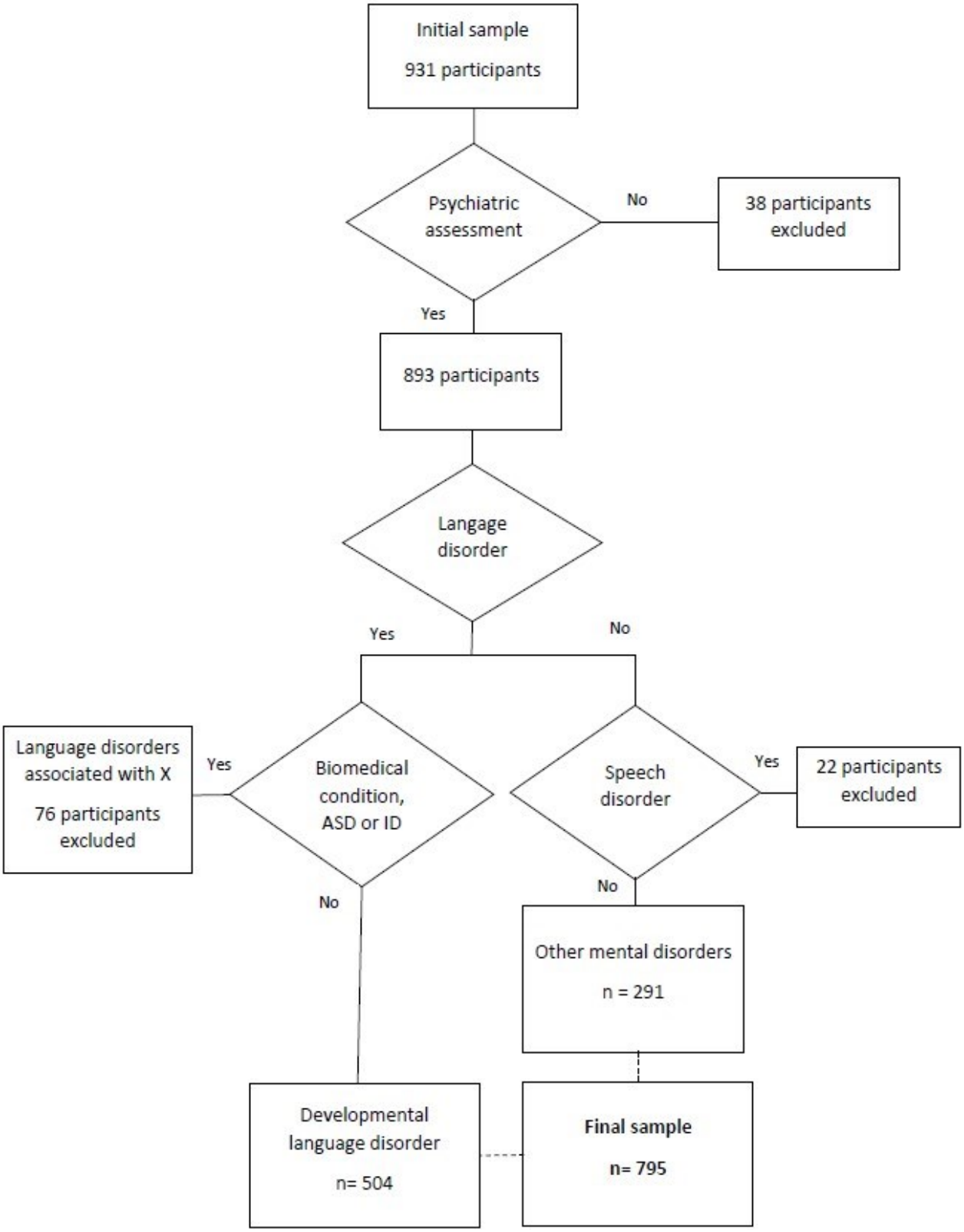
Regarding the second objective, in accordance with previous findings regarding multiple exposure and language pathological development, we hypothesize that the number of RF will be higher in children diagnosed with DLD than other MD.

Methods

Participants

Data was extracted from the information available in the medical records of children who consulted at an early childhood psychiatric clinic in a large metropolitan area (Montreal, Quebec, Canada). That clinic was responsible for providing services to all children referred for any developmental, emotional, and behavioral difficulties not primarily related to an ASD diagnosis. The institution's Research Ethics Board authorized access to the clinical records of all 931 patients assessed between 2000 and 2016. Medical files were reviewed by research assistants to extract psychiatric diagnoses as well as personal and familial characteristics. Children with no psychiatric assessment (n = 38) were excluded from the sample. Participants were then grouped into two categories according to the presence or absence of a DLD diagnosis in their clinical records. The DLD group included 504 preschoolers and the other 291 children formed the MD group. Following the CATALISE criteria (Bishop et al., 2017), children who were also diagnosed with ID, ASD, hearing impairment, or biomedical problems such as epilepsy or cerebral palsy (n = 76) were excluded from the DLD group, as were children with a speech disorder (n = 22). Figure 2 illustrates the constitution of the final sample of 795 participants. Participants were on average 4:11 years of age (*SD* 1:6 years) and the sex ratio was of 3 boys:1girl.

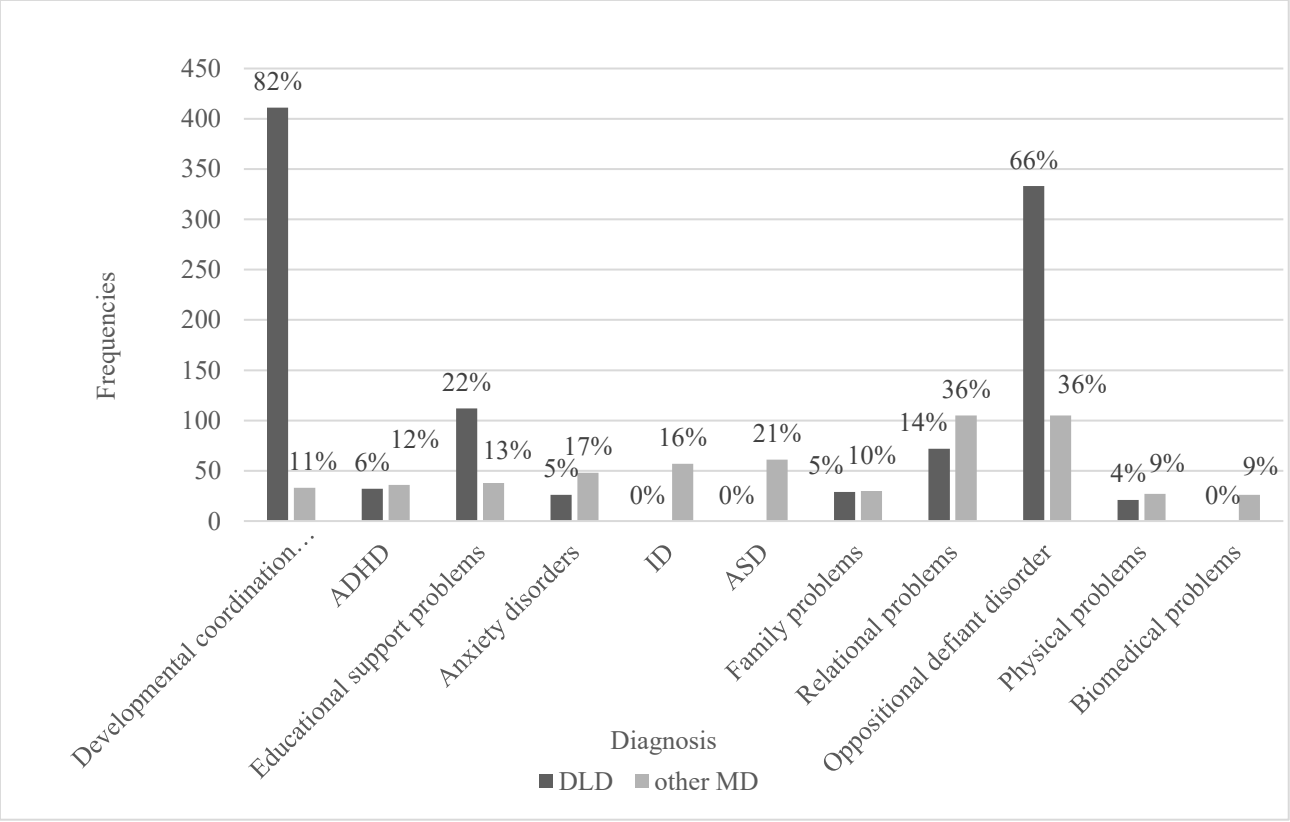
Figure 2. Flowchart illustrating the configuration of the final sample



Measures

Psychiatric Diagnoses. Accompanied by their parents, children met a psychiatrist who was assisted by another health professional specialized in mental health (i.e., a nurse). Diagnoses issued following a psychiatrist assessment were organized into disorders defined by the DSM-IV-TR's structure, which was the valid system at the time. Figure 3 illustrates the distribution of disorders according to DLD or other MD status. Some diagnoses were overrepresented in the DLD group. For example, 82% of children in the DLD group also had a developmental coordination disorder (DCD). As a result of the DLD definition, 0% of the children in the DLD group had an ASD, ID or biomedical problems.

Figure 3. Bar graph of the diagnosis distribution within DLD and other MD categories



Note. Eating disorder, sleep disorders, hearing impairment, learning disorder, tic disorders, central auditory processing disorder, sensory modulation impairment and stuttering were not included in the histogram because of their low prevalence in both groups (<5%).

Personal and Familial Risk Factors. The clinical preregistration questionnaire was sent routinely to parents of prospective patients. Information gathered included: child's sex, child and maternal age, maternal education, maternal country of birth, birth order, parents' marital status, family history of language delays as well as the child age of acquisition of the following developmental milestones: first words, first sentences, first steps, toilet training, eating independently. Information about perinatal conditions (gestational age and childbirth difficulties) was obtained from the birth hospital medical records. The percentages of missing values varied from 0% to 45,7% depending on the RF.

Cumulative Risk Index. The RF were transformed into dichotomous variables according to the significant threshold reported in the literature (Table 1). Due to underreporting issues, we included participants with available data for at least 12 out of the 15 RF (n = 549).

Data Analyses

Analyses were conducted in IBM SPSS Statistics version 27.0. Descriptive statistics were used to analyze individual, familial, and diagnoses variables. Variance inflation factors values indicated no collinearity issues.

According to Field's (2013) recommended selection procedure, the relationships between RF and type of diagnosis were examined using stepwise backwards logistic regression with elimination of variables that did not significantly contribute to the statistical model (elimination criterion of p-value > 0.1). At each step, the variable that had the lowest correlation with DLD was removed from the model. The final logistic regression measured simultaneously

the predicting value of remaining RF, with child age as a control variable. Explained variance was measured using Nagelkerke pseudo-R^2.

An analysis of covariance (ANCOVA) compared the average number of cumulative risk (CR) exposure between children with DLD and other MD while controlling for the number of diagnoses. Explained variance was measured with partial eta squared.

Results

Descriptive statistics

A total of 63% (504 out of 795) preschoolers were diagnosed with a developmental language disorder (DLD). Table 1 presents the descriptive statistics of the risk factors (RF) and the threshold used to create the dichotomous variable for total cumulative risk (CR).

Table 1. Descriptive statistics and threshold used for dichotomous variables (N = 795)

Risk factors	*n*	M	SD	Min	Max	%	Threshold used for CR
Personal							
Child age (months)	776	59.91	.67	14	154	-	-
Gender	795	-				100	Male gender (Brignell et al., 2018; Hammer et al., 2017)
Boy	598					75.2	
Girl	197					24.8	
Childbirth difficulties	694	-				100	Present
Yes	193					27.8	(Putnick et al., 2017)
No	501					72.2	
Gestational age at delivery	708	-				100	
Preterm (<37 weeks)	88					12.4	Preterm birth
Not preterm (37 weeks and more)	620					87.6	(Putnick et al., 2017)
Familial							

Maternal education	756	4.67	.04	0	7	-	No completion of high school (Muluk et al., 2014)
Maternal age (years)	432	34.10	.29	21	50	-	40 years old or + (Jones et al., 2020)
Birth order	780	1.74	.03	1	6	-	2nd children or + (Diepeveen et al., 2017)
Language spoken	482	-				100	Foreign language (McKean et al., 2015)
French only	236					49.0	
French and/or other	246					51.0	
Family history of language delays	471	-				100	Present (Conti-Ramsden & Durkin, 2012)
Yes	189					40.1	
No	282					59.9	
Maternal country of birth	762	-				100	Other than Canada (Summer, 2004)
Canada	462					60.6	
Other than Canada	300					39.4	
Parental marital status	775	-				100	Single parent (single, divorced, widowed) (Brignell et al., 2018).
Married	294					37.9	
Common-law	218					28.1	
Divorced	164					21.2	
Single	90					11.6	
Widowed	9					1.2	
Developmental (months)							
Acquisition of 1st words	616	12.15	.25	3	36	-	12 months or more (Bellman et al., 2013)
Acquisition 1st sentences	452	27.97	.46	7	60	-	24 months or more (Rescorla & Mirak, 1997)

First steps	721	13.42	.12	7	30	-	12 months or more (Bellman et al., 2013)
Eating independently	600	19.22	.35	4.5	48	-	18 months or more (Bellman et al., 2013)
Toilet training	445	31.83	.38	4	59	-	36 months or more (Bellman et al., 2013)

Logistic Regression Analyses

Risk Factor Selection Procedure. Stepwise backwards logistic regression reduced the initial 15 RF to six, which were included in the final model: (1) family history of language delay, (2) maternal immigration, (3) child gender, (4) first sentences after 24 months, (5) toilet training after 36 months and (6) independent eating after 18 months.

Final Regression Model. Results from the logistic regression (Table 2), based on backwards selection procedure, showed that, when controlling for child age, the odds of having DLD were six times higher for children who spoke their first sentences after 24 months (OR = 6.15, p <.001), almost three times higher for children of immigrant mothers (OR = 2.88, p <.01), and more than two times higher for children with family history of language delay (OR = 2.24, p = .03). Later toilet training and later independent eating as well as child's gender were not identified as meaningful predictors for DLD in the final model. The Nagelkerke pseudo-R2 indicated that approximately 30% of the variance for being diagnosed with DLD, rather than any other MD, was explained by the predictors, which represents a large effect (Cohen, 1998).

Table 2. Logistic regression examining risk factors predicting DLD (n = 121)

	B (S.E)	OR	95% CI for OR		
			LL	*UL*	*p*

Step 0: Control variable					
Child age	.02(.01)	1.02	1.00	1.04	.11
Step 1: Risk factors					
Child age	.01(.01)	1.01	.98	1.03	.43
Family history	.81(.38)	2.24	1.07	4.70	.03
Maternal country of birth	1.06(.41)	2.89	1.31	6.39	<.01
Child's gender	-.43(.39)	.65	.30	1.39	.27
Acquisition of 1st sentences	1.82(.36)	6.15	3.03	12.49	<.001
Eating independently	-.37(.38)	.69	.34	1.46	.33
Toilet training	.61(.35)	1.84	.93	3.62	0.08

Note. B= unstandardized regression weight; SE = standard error; OR = odds ratio; CI = confidence interval; LL = lower limit; UL = upper limit.

a. Variable entered on step 0. Child's age.

b. Variables entered on step 1. Family history, maternal country of birth, child's gender, 1st sentences after 24 months, toilet training after 36 months, eating independently after 18 months.

Treatment of Missing Values. Only 15% (121 out of 795) of participants presented all the data necessary to be included in the final model. To verify the representativeness of this subsample, participants with and without missing values were compared with one-way ANOVA (Table 3) and chi-square tests (Table 4). Participants without missing values were 7 months older in average and had mothers with higher levels of education than participants with missing values. No significant difference was found for gender, type of diagnosis (DLD or other MD), parental marital status and maternal age.

Table 3. One-way ANOVA comparison of participants with and without missing values

Characteristics	*M*	*F*	*p*	η^2
Child age (months)		12.11	<.001	0.02
With missing values (*n* = 656)	58.91			
Without missing values (*n* =121	65.35			
Maternal age (years)		.73	.39	0.00
With missing values (*n* = 311)	34.26			
Without missing values (*n* =121)	33.71			
Maternal education		17.25	<.001	0.02
With missing values (*n* = 635)	4.60			
Without missing values (*n* =121)	5.07			

Table 4. Chi-square test of independence comparison of participants with and without missing values

Characteristic	N	X^2	*p*
Child gender	795	.21	.65
Type of diagnosis	795	1.37	.24
Parents' marital status	775	0.05	.82

Cumulative Risk

Results from the ANCOVA (Table 5) indicated that children diagnosed with DLD are exposed to a significantly higher number of RF than those with other MD, even when the number of diagnoses is rendered equal. Adjusted means indicate that children with DLD are exposed to an average of 6.29 RF, while children with other MD are exposed to an average of 5.31 RF (F = 24.94; p = <.001). The partial eta-square (η_p^2 = 0.04) value shows a small to moderate effect size (Cohen, 1998).

Table 5. Results of the ANCOVA comparing total cumulated risk between DLD and other MD, while controlling for the number of diagnoses (n = 549)

	M (SD)	*F*	*p*	η_p^2
Cumulative risk		24.94	<.001	0.04
DLD (*n* = 352)	6.29 (.11)			
Other MD (*n* = 197)	5.31 (.15)			

Discussion

This large case-control study aimed to identify risk factors (RF) that distinguish developmental language disorder (DLD) from various mental disorders (MD) in a clinical cohort of 795 preschoolers.

DLD prevalence in this clinical cohort was 63%, which corresponds to the high rate of language disorder previously reported among clinical children (71%; Benner et al., 2002). Developmental coordination disorder (DCD) and oppositional defiant disorder (ODD) were

overrepresented in the DLD group, which is congruent with the high rates of comorbidity recently reported in other studies (ODD: Chow & Wehby, 2018; DCD: Flapper & Schoemaker, 2013). Our results do not allow to discriminate the influence of these disorders on DLD, yet they underline the importance of better documenting their co-occurrence with DLD by comparing clinical groups in future studies.

Individual Risk Factors

The first objective of the present study was to evaluate which RF allowed to distinguish between DLD and other MD. In line with the literature, we hypothesized that (1) later birth order (2) lower maternal education, (3) presence of family history of language delay and later acquisition of (4) first words and (5) first sentences would predict DLD in our clinical sample. This was partially confirmed. The final regression model showed that, two of those predictors, later acquisition of first sentences and family history of language delay, represented significantly greater risks for a DLD diagnosis than for other MD. Maternal immigration appeared as the third significant RF for DLD, which was an unexpected result.

Backwards selection procedure did not find perinatal conditions (gestational age and childbirth difficulties), age of acquisition of first steps, maternal education, maternal age, marital status, and foreign language spoken at home to be significant predictors for DLD status. Child gender, later toilet training and later independent eating were retained to be integrated in the final model but were not significant predictors in the final model. Although these RF might play a role in the development of DLD, this suggests that they may be markers for psychopathology more generally, but this hypothesis needs to be verified in future studies.

Acquisition of first sentences was the strongest predictor of DLD status among clinical preschoolers. This finding is consistent with a landmark study of Rescorla (1989), which noted that the absence of word combinations at 24 months was an indicator of persistent language deficits. Thus, age of first sentences merits special attention in the assessment of preschoolers and for referral to specialized language services.

Consulting children whose mother was born in another country and with a reported family history of language delay were respectively 2,88 and 2,24 times more likely to be diagnosed with a DLD when compared to children diagnosed with other MD.

Neither multilingualism at home nor maternal level of education predicted DLD diagnoses within this clinical sample. Lindsay et al. (2016) also reported that children with speech, language and communication needs were overrepresented in ethnic groups at school age. Since the present study cannot explain this overrepresentation, further studies are needed to understand the possible impact of immigration as a factor to consider in the early identification of DLD. Future studies about multilingual family environment should document maternal immigration as a potential confounding variable when studying the relation between multilingualism and language development.

It was expected that family history of language delays would predict DLD diagnosis, since this RF is robustly documented (Conti-Ramsden & Durkin, 2017). The present study replicated this finding even if the comparison group included other diagnoses with a strong language delay component such as ID and ASD.

Therefore, consulting preschoolers who express their first sentence after 24 months, whose mother was born in another country or for whom there is a family history of language delay, are more likely to be diagnosed with a DLD than any other MD. Even though male gender,

later independent eating and later toilet training were not significant predictors of DLD in our final model, it remained important to simultaneously measure several RF to identify which are really discriminating or which have a more indirect effect. These RF are documented in the literature but are not specific to DLD among a group of clinical children. Other studies should compare clinical groups to better understand which RF are specifically associated with distinct MD and which are associated with psychopathology in general.

Cumulative Risk Factors

The second objective was to determine if the number of RF, regardless of the nature of the risk, distinguished DLD diagnosis form other MD in our clinical sample. In accordance with our hypothesis, we found that children with DLD were exposed to a significantly higher number of RF than those with other MD, even when controlling for the number of diagnoses. In other words, identifying specific characteristics appears necessary but insufficient to target at-risk children for DLD in a clinical sample; the exposition to multiple risks must also be considered. The results translate the higher level of adversity that children with DLD are susceptible to have been exposed to. This is the first study to document CR in DLD and future studies are necessary to explain the intensity of risk exposition in this population. In sum, from a prevention perspective, it is important to consider that the effect of some stressors might not be detectable unless they are present in conjunction with other RF. Considering the poor outcomes children with DLD (Schoon et al., 2010), the severity of the problems associated with this disorder should not be underestimated.

Limitations and Strengths of the Study

The current study has limitations, several resulting from relying on data extraction from clinical archives. This method allowed to access an entire cohort of preschoolers who had

consulted in psychiatry without attrition but resulted in a high rate of missing values. Representativeness of results was verified by comparing socio-demographic characteristics of participants with and without missing values. Participants of both groups presented similar characteristics, except that children with missing values were almost 7 months older and had mothers with lower education. The missing data could have contributed to the loss of variance in maternal education and maternal age, which could have an impact on their lack of statistical association with the DLD diagnosis. Further studies comparing groups of clinical children could verify if maternal education is a general risk factor in many diagnoses or distinguishes between diagnoses. This exploratory study should be replicated in other clinical settings to verify the generalisation of the results to other samples composed of children with DLD as well as other MD.

The heterogeneity of the difficulties experienced by the children between and within the two groups (DLD and other MD) reduced the possibility to distinguish the effect of RF on other specific disorders. Failure to identify participants' comorbidities is a very common limitation among studies (Vasileva et al., 2021; Wallisch et al., 2020). Our study is the first to properly document all diagnoses presented by patients in child psychiatry, which better reflects the complexity of this clinical population. More studies that consider comorbid disorders are needed to develop a better understanding of MD and their associated factors.

Finally, to emphasize the dynamic aspect of psychopathology, future research should include both risk and protective factors. Proximal factors could be measured, such as quality of parent-child interactions or daycare attendance. Future studies could also use a transversal criterion, such as the level of language deficit, regardless of the disorder, rather than relying on categories, to verify if similar results are observed.

Despite these limitations, a major strength of our study lies in its ecological validity due to its clinical sample. The sample size and the width of our database allowed to identify many potential RF for DLD in early childhood psychiatry. It also improves our current understanding of DLD by comparing it with other disorders. The integrative and wider perspective about MD proposed in this paper is innovative and allowed to demonstrate that some RF do discriminate among clinical groups, which cannot be verified when no clinical comparison groups are included.

Clinical Implications

Better knowledge on specific RF that distinguish among MD can guide clinicians and health agencies in their identification strategies and assessment algorithms in order to improve early detection of DLD. The present study found that speaking first sentences after 24 months old, family history of language delay and maternal immigration, not only distinguish DLD from other MD but account for 30% of explained variance among preschoolers consulting in a psychiatric clinic. Given the strong evidence regarding speaking first sentences after 24 months, which by itself multiplies by six the probability of belonging to the DLD group, clinicians and frontline professionals (i.e. pediatricians, developmental nurses) should systematically document this milestone. In addition, children who have a family history of language delay and who have an immigrant mother should be referred directly for a DLD assessment, instead of waiting for a potential recovery from their difficulties. This contribution is even more important considering that DLD is largely under-identified among clinical populations consulting for emotional and behavioral problems (Hollo et al., 2014). Adding these criteria to the decision-making process would make it easier to identify and allocate services to those children in need of early intervention. In our study, children with DLD were almost five years old in average at the time of

the assessment. This implies that they spent three years with significant language difficulties and without a diagnosis, which can have a dramatic impact in terms of prognosis. Children who start school with this great delay are highly likely to have difficulty catching up (Capone Singleton, 2018). First-line language stimulation programs should be offered to these children earlier, especially since language delay at 24 months increases the risk of low school readiness at 60 months (Hammer et al., 2017). Finally, early detection is critical considering that DLD seems to be itself an important risk factor for presenting other severe mental disorders later in childhood or in adulthood, such as schizophrenia (Mouridsen & Hauschild, 2008). A better understanding of DLD could therefore help prevent other severe mental disorders.

Another important message of this paper is that children with DLD face a high level of adversity and need to adapt on several fronts, which compromise their development. Cumulative risk measures might be another strategy to integrate in DLD early detection programs to help reduce the effects of various RF that cumulatively affect children's experience (Sameroff, 2006). This area of research needs to be a priority given the poor outcomes for children with a DLD. In conclusion, informing public health policies with the knowledge of specific RF associated with DLD, and the cumulative impact of various RF on affected children, could improve early detection and reduce the cascade of negative consequences associated with DLD.

References

Achenbach, T. M., & Rescorla, M. A. (2000). *Manuel of the Child Behavior Checklist 1.5/5 years*. University of Vermont, Research Center for Children, Youth, and Families.

Alexander, K. E., Brijnath, B., & Mazza, D. (2013). "Can they really identify mental health problems at the age of three?" Parent and practitioner views about screening young children's social and emotional development. *Australian and New Zealand Journal of Psychiatry*, *47*(6), 538–545. https://doi.org/10.1177/0004867413476756

AlHammadi, F. S. (2017). Prediction of child language development: A review of literature in early childhood communication disorders. *Lingua*, *199*, 27–35. https://doi.org/10.1016/j.lingua.2017.07.007

American Psychiatric Association. (2022). *Manuel diagnotic et statistique des troubles mentaux* (5e édition). https://doi.org/https://doi.org/10.1176/appi.books.9780890425596

Andersson, K., Hansson, K., Rosqvist, I., Åhlander, V. L., Sahlén, B., & Sandgren, O. (2019). The contribution of bilingualism, parental education, and school characteristics to performance on the clinical evaluation of language fundamentals: Fourth edition, Swedish. *Frontiers in Psychology*, *10*, 1–7. https://doi.org/10.3389/fpsyg.2019.01586

Astle, D. E., Holmes, J., Kievit, R., & Gathercole, S. E. (2022). Annual Research Review: The transdiagnostic revolution in neurodevelopmental disorders. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *63*(4), 397–417. https://doi.org/10.1111/jcpp.13481

Bellman, M., Byrne, O., & Sege, R. (2013). Developmental assessment of children. *BMJ (Online)*, *345*(7891), 1–9. https://doi.org/10.1136/bmj.e8687

Benner, G. J., Nelson, J. R., & Epstein, M. H. (2002). Language skills of children with EBD: A literature review. *Journal of Emotional and Behavioral Disorders*, *10*(1), 43–59. https://doi.org/10.1177/106342660201000105

Bishop, D., Clark, B., Conti-Ramsden, G., Norbury, C. F., & Snowling, M. J. (2012). RALLI: An internet campaign for raising awareness of language learning impairments. *Child Language Teaching and Therapy*, *28*(3), 259–262. https://doi.org/10.1177/0265659012459467

Bishop, D., Snowling, M. J., Thompson, P. A., & Greenhalgh, T. (2017). Phase 2 of CATALISE: A multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. https://doi.org/10.1111/jcpp.12721

Bishop, D., Snowling, M. J., Thompson, P. A., Greenhalgh, T., Adams, C., Archibald, L., Baird, G., Bauer, A., Bellair, J., Boyle, C., Brownlie, E., Carter, G., Clark, B., Clegg, J., Cohen, N., Conti-Ramsden, G., Dockrell, J., Dunn, J., Ebbels, S., … Whitehouse, A. (2016). CATALISE: A multinational and multidisciplinary Delphi consensus study. Identifying language impairments in children. *Plos One*, *11*(7), 1–26. https://doi.org/10.1371/journal.pone.0158753

Bishop, D., Snowling, M., Thompson, P., Greenhalgh, T., Adams, C., Archibald, L., Baird, G., Bauer, A., Bellair, J., Boyle, C., Brownlie, E., Carter, G., Clark, B., Clegg, J., Cohen, N., Conti-Ramsden, G., Dockrell, J., Dunn, J., Ebbels, S., … House, A. (2017). Phase 2 of CATALISE: a multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *58*(10), 1068–1080. https://doi.org/10.1111/jcpp.12721

Blank, R., Barnett, A. L., Cairney, J., Green, D., Kirby, A., Polatajko, H., Rosenblum, S., Smits-Engelsman, B., Sugden, D., Wilson, P., & Vinçon, S. (2019). International clinical practice recommendations on the definition, diagnosis, assessment, intervention, and psychosocial aspects of developmental coordination disorder. *Developmental Medicine and Child Neurology*, *61*(3), 242–285. https://doi.org/10.1111/dmcn.14132

Breault, C., Béliveau, M. J., Labelle, F., Valade, F., & Trudeau, N. (2023). Stability of language difficulties among a clinical sample of preschoolers. *International Journal of Language and Communication Disorders*, *58*(1), 138–153. https://doi.org/10.1111/1460-6984.12776

Briggs-Gowan, M. J., Carter, A. S., Bosson-Heenan, J., Guyer, A. E., & Horwitz, S. M. (2006). Are Infant-Toddler Social-Emotional and Behavioral Problems Transient ? *Journal of the American Academy of Child & Adolescent Psychiatry*, *45*(7), 849–858. https://doi.org/10.1097/01.chi.0000220849.48650.59

Briggs-Gowan, M. J., Carter, A. S., Skuban, E. M., & Horwitz, S. M. C. (2001). Prevalence of social-emotional and behavioral problems in a community sample of 1- and 2-year-old children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *40*(7), 811–819. https://doi.org/10.1097/00004583-200107000-00016

Brignell, A., Williams, K., Jachno, K., Prior, M., Reilly, S., & Morgan, A. T. (2018). Patterns and Predictors of Language Development from 4 to 7 Years in Verbal Children With and Without Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, *48*(10), 3282–3295. https://doi.org/10.1007/s10803-018-3565-2

Bufferd, S. J., Dougherty, L. R., Carlson, G. A., Rose, S., & Klein, D. N. (2012). Psychiatric disorders in preschoolers: Continuity from ages 3 to 6. *American Journal of Psychiatry*,

169(11), 1157–1164. https://doi.org/10.1176/appi.ajp.2012.12020268

Campbell, T. F., Dollaghan, C. A., Rackette, H. E., Paradise, J. L., Feldman, H. M., Shriberg, L. D., Sabo, D. L., & Kurs-Lasky, M. (2003). Risk Factors for Speech Delay of Unknown Origin in 3-Year-Old Children. *Child Development*, *74*(2), 346–357. https://doi.org/10.1111/1467-8624.7402002

Capone Singleton, N. (2018). Late Talkers: Why the Wait-and-See Approach Is Outdated. *Pediatric Clinics of North America*, *65*(1), 13–29. https://doi.org/10.1016/j.pcl.2017.08.018

Caron, C., & Rutter, M. (1991). Comorbidity in Child Psychopathology: Concepts, Issues and Research Strategies. *Journal of Child Psychology and Psychiatry*, *32*(7), 1063–1080. https://doi.org/10.1111/j.1469-7610.1991.tb00350.x

Charach, A., Mohammadzadeh, F., Belanger, S. A., Easson, A., Lipman, E. L., McLennan, J. D., Parkin, P., & Szatmari, P. (2020). Identification of preschool children with mental health problems in primary care: Systematic review and identification of preschool children with mental health problems in primary care: Systematic review and meta-analysis. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *29*(2), 76–105.

Chen, H. J., Hsin-Ju Ko, M., Li, S. T., Chiu, N. C., & Hung, K. L. (2020). Prevalence of preschool children developmental disabilities in northeastern Taiwan - Screening with Taipei City Developmental Screening Checklist for Preschoolers, 2nd Version. *Journal of the Formosan Medical Association*, *119*(7), 1174–1179. https://doi.org/10.1016/j.jfma.2020.02.001

Chow, J. C., & Wehby, J. H. (2018). Associations Between Language and Problem Behavior: a

Systematic Review and Correlational Meta-analysis. *Educational Psychology Review*, *30*(1), 61–82. https://doi.org/10.1007/s10648-016-9385-z

Chung, C. Y., Liu, W. Y., Chang, C. J., Chen, C. L., Tang, S. F. T., & Wong, A. M. K. (2011). The relationship between parental concerns and final diagnosis in children with developmental delay. *Journal of Child Neurology*, *26*(4), 413–419. https://doi.org/10.1177/0883073810381922

Collisson, B. A., Graham, S. A., Preston, J. L., Rose, M. S., McDonald, S., & Tough, S. (2016). Risk and protective factors for late talking: An epidemiologic investigation. *Journal of Pediatrics*, *172*, 168-174.e1. https://doi.org/10.1016/j.jpeds.2016.02.020

Conti-Ramsden, G., & Durkin, K. (2012). Language development and assessment in the preschool period. *Neuropsychology Review*, *22*(4), 384–401. https://doi.org/10.1007/s11065-012-9208-z

Conti-Ramsden, G., & Durkin, K. (2016). What Factors Influence Language Impairment? Considering Resilience as well as Risk. *Folia Phoniatrica et Logopaedica*, *67*(6), 293–299. https://doi.org/10.1159/000444750

Conti-Ramsden, G., & Durkin, K. (2017). Developmental Language Disorder. In D. Skuse, H. Bruce, & L. Dowdney (Eds.), *Child psychology and psychiatry: Frameworks for clinical training and practice* (pp. 307–313). Wiley Blackwell.

Conti-Ramsden, G., Durkin, K., Toseeb, U., Botting, N., & Pickles, A. (2018). Education and employment outcomes of young adults with a history of developmental language disorder. *International Journal of Language and Communication Disorders*, *53*(2), 237–255.

https://doi.org/10.1111/1460-6984.12338

Conti-Ramsden, G., Mok, P. L. H., Pickles, A., & Durkin, K. (2013). Adolescents with a history of specific language impairment (SLI): Strengths and difficulties in social, emotional and behavioral functioning. *Research in Developmental Disabilities*, *34*(11), 4161–4169. https://doi.org/10.1016/j.ridd.2013.08.043

Cree, R. A., Bitsko, R. H., Robinson, L. R., Holbrook, J. R., Danielson, M. L., Smith, C., Kaminski, J. W., Kenney, M. K., & Peacock, G. (2018). Health Care, Family, and Community Factors Associated with Mental, Behavioral, and Developmental Disorders and Poverty Among Children Aged 2–8 Years — United States, 2016. *MMWR. Morbidity and Mortality Weekly Report*, *67*(50), 1377–1383. https://doi.org/10.15585/mmwr.mm6750a1

Deakin-Bell, N., Walker, K., & Badawi, N. (2013). The accuracy of parental concern expressed in the Ages and Stages Questionnaire to predict developmental delay. *Journal of Paediatrics and Child Health*, *49*(2), 133–136. https://doi.org/10.1111/jpc.12084

Diepeveen, F. B., van Dommelen, P., Oudesluys-Murphy, A. M., & Verkerk, P. H. (2017). Specific language impairment is associated with maternal and family factors. *Child: Care, Health and Development*, *43*(3), 401–405. https://doi.org/10.1111/cch.12451

Dockrell, J., Ricketts, J., & Lindsay, G. (2012). Understanding speech, language and communication needs: Profiles of need and provision. In *Department for Education (DfE)* (Vol. 1, Issue November). https://dera.ioe.ac.uk/id/eprint/16322/1/DFE-RR247-BCRP4.pdf

Dougherty, L. R., Leppert, K. A., Merwin, S. M., Smith, V. C., Bufferd, S. J., & Kushner, M. R. (2015). Advances and directions in preschool mental health research. *Child Development*

Perspectives, *9*(1), 14–19. https://doi.org/10.1111/cdep.12099

Elbro, C., Dalby, M., & Maarbjerg, S. (2011). Language-learning impairments: A 30-year follow-up of language-impaired children with and without psychiatric, neurological and cognitive difficulties. *International Journal of Language and Communication Disorders*, *46*(4), 437–448. https://doi.org/10.1111/j.1460-6984.2011.00004.x

Ellingson, K. D., Briggs-Gowan, M. J., Carter, A. S., & Horwitz, S. M. (2004). Parent identification of early emerging child behavior problems: Predictors of sharing parental concern with health providers. *Archives of Pediatrics and Adolescent Medicine*, *158*(8), 766–772. https://doi.org/10.1001/archpedi.158.8.766

Farnesi, B. C., Newton, A. S., Holt, N. L., Sharma, A. M., & Ball, G. D. C. (2012). Exploring collaboration between clinicians and parents to optimize pediatric weight management. *Patient Education and Counseling*, *87*(1), 10–17. https://doi.org/10.1016/j.pec.2011.08.011

Flapper, B. C. T., & Schoemaker, M. M. (2013). Developmental Coordination Disorder in children with specific language impairment: Co-morbidity and impact on quality of life. *Research in Developmental Disabilities*, *34*(2), 756–763. https://doi.org/10.1016/j.ridd.2012.10.014

Ford, T., Sayal, K., Meltzer, H., Goodman, R., Ford, T., & Goodman, R. (2005). *Parental concerns about their child ' s emotions and behaviour and referral to specialist services : general population survey*. 1435–1436. https://doi.org/10.1136/bmj.38643.368692.681

Franck, L. S., & O'Brien, K. (2019). The evolution of family-centered care: From supporting parent-delivered interventions to a model of family integrated care. *Birth Defects Research*,

111(15), 1044–1059. https://doi.org/10.1002/bdr2.1521

Glascoe, F. P. (2003). *Parents' Evaluation of Developmental Status: How Well Do Parents' Concerns Identify Children With Behavioral and Emotional Problems? Frances*. *March*, 133–138.

Gleason, M. M., Zeanah, C. H., & Dickstein, S. (2010). Recognizing young children in need of mental health assessment: Development and preliminary validity of the early childhood screening assessment. *Infant Mental Health Journal*, *31*(3), 335–357. https://doi.org/10.1002/imhj.20259

Godoy, L., Carter, A. S., Silver, R. B., Dickstein, S., & Seifer, R. (2014). Infants and toddlers left behind: Mental health screening and consultation in primary care. *Journal of Developmental and Behavioral Pediatrics*, *35*(5), 334–343. https://doi.org/10.1097/DBP.0000000000000060

Gouvernement du Québec. (2022). *Plan d'action interministériel en santé mentale 2022-2026*. https://publications.msss.gouv.qc.ca/msss/fichiers/2021/21-914-14W.pdf

Halperin, J. M., & Marks, D. J. (2019). Practitioner Review: Assessment and treatment of preschool children with attention-deficit/hyperactivity disorder. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *60*(9), 930–943. https://doi.org/10.1111/jcpp.13014

Hammer, C. S., Morgan, P., Farkas, G., Hillemeier, M., Bitetti, D., & Maczuga, S. (2017). Late talkers: A population-based study of risk factors and school readiness consequences. *Journal of Speech, Language, and Hearing Research*, *60*(3), 607–626. https://doi.org/10.1044/2016_JSLHR-L-15-0417

Hansen, A., Telléus, G. K., Mohr-Jensen, C., & Lauritsen, M. B. (2021). Parent-perceived barriers to accessing services for their child's mental health problems. *Child and Adolescent Psychiatry and Mental Health*, *15*(1), 1–11. https://doi.org/10.1186/s13034-021-00357-7

Hansen, B. H., Oerbeck, B., Skirbekk, B., Petrovski, B. É., & Kristensen, H. (2018). Neurodevelopmental disorders: prevalence and comorbidity in children referred to mental health services. *Nordic Journal of Psychiatry*, *72*(4), 285–291. https://doi.org/10.1080/08039488.2018.1444087

Haque, M. M., Rabbani, M., Dipal, D. Das, Zarif, M. I. I., Iqbal, A., Schwichtenberg, A., Bansal, N., Soron, T. R., Ahmed, S. I., & Ahamed, S. I. (2021). Informing developmental milestone achievement for children with autism: Machine learning approach. *JMIR Medical Informatics*, *9*(6), 1–21. https://doi.org/10.2196/29242

Hollo, A., Wehby, J. H., & Oliver, R. M. (2014). Unidentified language deficits in children with emotional and behavioral disorders: A meta-analysis. *Exceptional Children*, *80*(2), 169–186. https://doi.org/10.1177/001440291408000203

Horwitz, S. M., Gary, L. C., Briggs-Gowan, M. J., & Carter, A. S. (2003). Do Needs Drive Services Use in Young Children? *Pediatrics*, *112*(6 I), 1373–1378. https://doi.org/10.1542/peds.112.6.1373

Horwitz, S. M., Irwin, J. R., Briggs-Gowan, M. J., Bosson Heenan, J. M., Mendoza, J., & Carter, A. S. (2003). Language Delay in a Community Cohort of Young Children. *Journal of the American Academy of Child & Adolescent Psychiatry*, *42*(8), 932–940. https://doi.org/10.1097/01.CHI.0000046889.27264.5E

Institut national d'excellence en santé et en services sociaux (INESSS). (2021). *Trajectoires de services menant à l'évaluation diagnostique des troubles neurodéveloppementaux chez les enfants de la naissance à sept ans*.

Katagiri, M., Ito, H., Murayama, Y., Hamada, M., Nakajima, S., Takayanagi, N., Uemiya, A., Myogan, M., Nakai, A., & Tsujii, M. (2021). Fine and gross motor skills predict later psychosocial maladaptation and academic achievement. *Brain and Development*, *43*(5), 605–615. https://doi.org/10.1016/j.braindev.2021.01.003

Kim, J. H., Davies, B., & Xu Rattanasone, N. (2022). Have You Heard of Developmental Language Disorder? An Online Survey. *Communication Disorders Quarterly*, *44*(4), 228–238. https://doi.org/10.1177/15257401221115822

King-Dowling, S., Rodriguez, M. C., Missiuna, C., & Cairney, J. (2016). Validity of the Ages and Stages Questionnaire to detect risk of Developmental Coordination Disorder in preschoolers. *Child: Care, Health and Development*, *42*(2), 188–194. https://doi.org/10.1111/cch.12314

Korpilahti, P., Kaljonen, A., & Jansson-Verkasalo, E. (2016). Identification of biological and environmental risk factors for language delay: The Let's Talk STEPS study. *Infant Behavior and Development*, *42*, 27–35. https://doi.org/10.1016/j.infbeh.2015.08.008

Le, H. A. N. D., Gold, L., Mensah, F., Eadie, P., Bavin, E. L., Bretherton, L., & Reilly, S. (2017). Service utilisation and costs of language impairment in children: The early language in Victoria Australian population-based study. *International Journal of Speech-Language Pathology*, *19*(4), 360–369. https://doi.org/10.1080/17549507.2016.1209559

Lipkin, P. H., Macias, M. M., & AAP COUNCIL ON CHILDREN WITH DISABILITIES, S. O. D. A. B. P. (2020). Promoting optimal development: Identifying Infants and Young Children With Developmental Disorders Through Developmental Surveillance and Screening. *Pediatrics*, *145*(1). https://doi.org/10.1542/PEDS.2019-3449

Locatelli, C., Onnivello, S., Antonaros, F., Feliciello, A., Filoni, S., Rossi, S., Pulina, F., Marcolin, C., Vianello, R., Toffalini, E., Ramacieri, G., Martelli, A., Procaccini, G., Sperti, G., Caracausi, M., Pelleri, M. C., Vitale, L., Pirazzoli, G. L., Strippoli, P., … Lanfranchi, S. (2021). Is the age of developmental milestones a predictor for future development in down syndrome? *Brain Sciences*, *11*(5). https://doi.org/10.3390/brainsci11050655

Loughan, A. R., & Perna, R. (2013). Early Developmental Delays: A Cross Validation Study. *Journal of Psychological Abnormalities in Children*, *01*(02), 1–5. https://doi.org/10.4172/2329-9525.1000105

Mash, E. J., & Hayden, E. P. (2014). Child Psychopathology A Developmental – Systems Perspective. In *Child Psychopathology* (pp. 3–72).

McEwen, B. S., & Stellar, E. (1993). Stress and the Individual: Mechanisms Leading to Disease. *Archives of Internal Medicine*, *153*(18), 2093–2101. https://doi.org/10.1001/archinte.1993.00410180039004

McKean, C., Mensah, F. K., Eadie, P., Bavin, E. L., Bretherton, L., Cini, E., & Reilly, S. (2015). Levers for language growth: Characteristics and predictors of language trajectories between 4 and 7 years. *PLoS ONE*, *10*(8), 1–21. https://doi.org/10.1371/journal.pone.0134251

Movahedazarhouligh, S. (2022). Evidence-Based, Empirically Supported, or Scientifically

Unsupported? An Overview of the Research to Practice Gap in Early Childhood Special Education. *Journal of Educational Studies and Multidisciplinary Approaches*, *2*(1), 37–51.

Muluk, N. B., Bayoğlu, B., & Anlar, B. (2014). Language development and affecting factors in 3- to 6-year-old children. *European Archives of Oto-Rhino-Laryngology*, *271*(5), 871–878. https://doi.org/10.1007/s00405-013-2567-0

Norbury, C. F., Gooch, D., Wray, C., Baird, G., Charman, T., Simonoff, E., Vamvakas, G., & Pickles, A. (2016). The impact of nonverbal ability on prevalence and clinical presentation of language disorder: evidence from a population study. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *57*(11), 1247–1257. https://doi.org/10.1111/jcpp.12573

Oh, E., Mathers, M., Hiscock, H., Wake, M., Oh, E., Mathers, M., Hiscock, H., Wake, M., Bayer, J., Oh, E., Mathers, M., Hiscock, H., Wake, M., & Bayer, J. (2015). Professional help seeking for young children with mental health problems. *Australian Journal of Psychology, 3*(67), 187–195. https://doi.org/10.1111/ajpy.12072

Parsons, S., Schoon, I., Rush, R., & Law, J. (2011). Long-term Outcomes for Children with Early Language Problems : Beating the Odds. *Children & Society*, *25*, 202–214. https://doi.org/10.1111/j.1099-0860.2009.00274.x

Peverill, M., Dirks, M. A., Narvaja, T., Herts, K. L., Comer, J. S., & McLaughlin, K. A. (2021). Socioeconomic status and child psychopathology in the United States: A meta-analysis of population-based studies. *Clinical Psychology Review*, *83*(October 2020). https://doi.org/10.1016/j.cpr.2020.101933

Putnick, D. L., Bornstein, M. H., Eryigit-Madzwamuse, S., & Wolke, D. (2017a). Long-Term

Stability of Language Performance in Very Preterm, Moderate-Late Preterm, and Term Children. *Journal of Pediatrics*, *181*, 74-79.e3. https://doi.org/10.1016/j.jpeds.2016.09.006

Putnick, D. L., Bornstein, M. H., Eryigit-Madzwamuse, S., & Wolke, D. (2017b). Long-Term Stability of Language Performance in Very Preterm, Moderate-Late Preterm, and Term Children Diane. *Physiology & Behavior*, *176*(12), 139–148. https://doi.org/10.1016/j.jpeds.2016.09.006.Long-Term

Radez, J., Reardon, T., Creswell, C., Lawrence, P. J., Evdoka-Burton, G., & Waite, P. (2021). Why do children and adolescents (not) seek and access professional help for their mental health problems? A systematic review of quantitative and qualitative studies. *European Child and Adolescent Psychiatry*, *30*(2), 183–211. https://doi.org/10.1007/s00787-019-01469-4

Reilly, S., Wake, M., Ukoumunne, O. C., Bavin, E., Prior, M., Cini, E., Conway, L., Eadie, P., & Bretherton, L. (2010). Predicting language outcomes at 4 years of age: Findings from early language in Victoria study. *Pediatrics*, *126*(6). https://doi.org/10.1542/peds.2010-0254

Rescorla, L., & Mirak, J. (1997). Normal language acquisition. *Seminars in Pediatric Neurology*, *4*(2), 70–76. https://doi.org/10.1016/S1071-9091(97)80022-8

Rinaldi, P., Bello, A., Simonelli, I., & Caselli, M. C. (2023). Is Specific Learning Disorder Predicted by Developmental Language Disorder? Evidence from a Follow-Up Study on Italian Children. *Brain Sciences*, *13*(4). https://doi.org/10.3390/brainsci13040701

Rudolph, J. M. (2017). Case history risk factors for specific language impairment: A systematic review and meta-analysis. *American Journal of Speech-Language Pathology*, *26*(3), 991–

1010. https://doi.org/10.1044/2016_AJSLP-15-0181

Sameroff, A. (2006). Child development. In A. Clarke-Stewart & J. Dunn (Eds.), *Families count: Effects on child and adolescent development* (pp. 53–76). Cambridge University Press. https://doi.org/https://doi.org/10.1017/CBO9780511616259.004

Sansavini, A., Favilla, M. E., Guasti, M. T., Marini, A., Millepiedi, S., Di Martino, M. V., Vecchi, S., Battajon, N., Bertolo, L., Capirci, O., Carretti, B., Colatei, M. P., Frioni, C., Marotta, L., Massa, S., Michelazzo, L., Pecini, C., Piazzalunga, S., Pieretti, M., … Lorusso, M. L. (2021). Developmental language disorder: Early predictors, age for the diagnosis, and diagnostic tools. A scoping review. *Brain Sciences*, *11*(5), 1–38. https://doi.org/10.3390/brainsci11050654

Schieve, L. A., Clayton, H. B., Durkin, M. S., Wingate, M. S., & Drews-Botsch, C. (2015). Comparison of Perinatal Risk Factors Associated with Autism Spectrum Disorder (ASD), Intellectual Disability (ID), and Co-occurring ASD and ID. *Journal of Autism and Developmental Disorders*, *45*(8), 2361–2372. https://doi.org/10.1007/s10803-015-2402-0

Schoon, I., Parsons, S., Rush, R., & Law, J. (2010). Children's language ability and psychosocial development: A 29-year follow-up study. *Pediatrics*, *126*(1), 73–80. https://doi.org/10.1542/peds.2009-3282

Sheldrick, R. C., Merchant, S., & Perrin, E. C. (2011). Identification of developmental-behavioral problems in primary care: A systematic review. *Pediatrics*, *128*(2), 356–363. https://doi.org/10.1542/peds.2010-3261

Shephard, E., Zuccolo, P. F., Idrees, I., Godoy, P. B. G., Salomone, E., Ferrante, C., Sorgato, P.,

Catão, L. F. C. C., Goodwin, A., Bolton, P. F., Tye, C., Groom, M. J., & Polanczyk, G. V. (2022). Systematic Review and Meta-analysis: The Science of Early-Life Precursors and Interventions for Attention-Deficit/Hyperactivity Disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *61*(2), 187–226. https://doi.org/10.1016/j.jaac.2021.03.016

Sim, F., Thompson, L., Marryat, L., Law, J., & Wilson, P. (2019). Preschool developmental concerns and adjustment in the early school years: Evidence from a Scottish birth cohort. *Child: Care, Health and Development*, *45*(5), 719–736. https://doi.org/10.1111/cch.12695

Skeat, J., Wake, M., Ukoumunne, O. C., Eadie, P., Bretherton, L., & Reilly, S. (2014). Who gets help for pre-school communication problems? Data from a prospective community study. *Child: Care, Health and Development*, *40*(2), 215–222. https://doi.org/10.1111/cch.12032

Smolla, N., Béliveau, M.-J., Breault, C., Noël, R., Lévesque, A., Gagné, G., Berthiaume, C., & Martin, V. (2018). Enfants d'âge préscolaire évalués en psychiatrie: l'inquiétude parentale concernant le langage dépend-elle de la sévérité des atteintes expressives et réceptives? *Canadian Journal of Speech-Language Pathology and Audiology*, *42*(1), 21–40.

Smolla, N., Lévesque, A., Berthiaume, C., & Martin, V. (2015). *La pertinence de l'inquiétude parentale pour le développement langagier du jeune enfant référé en psychiatrie*. *36*, 235–263.

Stanton-Chapman, T. L., Chapman, D. A., Kaiser, A. P., & Hancock, T. B. (2004). Cumulative Risk and Low-Income Children's Language Development. *Topics in Early Childhood Special Education*, *24*(4), 227–237. https://doi.org/10.1177/02711214040240040401

Tran, A. T., del Rosario, M., Nosco, E., Li, Y., Senturk, D., Mcdonald, N. M., Wilson, R. B., Dapretto, M., & Jeste, S. S. (2021). Early concerns in parents of infants at risk for autism. *Developmental Medicine and Child Neurology*, *63*(12), 1410–1416. https://doi.org/10.1111/dmcn.14925

Trevethan, R. (2017). *Sensitivity, Specificity, and Predictive Values: Foundations, Pliabilities, and Pitfalls in Research and Practice*. *5*(November), 1–7. https://doi.org/10.3389/fpubh.2017.00307

Uljarević, M., Katsos, N., Hudry, K., & Gibson, J. L. (2016). Practitioner Review: Multilingualism and neurodevelopmental disorders – an overview of recent research and discussion of clinical implications. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *57*(11), 1205–1217. https://doi.org/10.1111/jcpp.12596

Valade, F., Béliveau, M.-J., Breault, C., Chabot, B., & Labelle, F. (2022). *Individual and cumulative risk factors in developmental language disorder : A case-control study*. *0*(0), 1–17. https://doi.org/10.1177/13591045221113389

Vasileva, M., Graf, R. K., Reinelt, T., Petermann, U., & Petermann, F. (2021). Research review: A meta-analysis of the international prevalence and comorbidity of mental disorders in children between 1 and 7 years. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *62*(4), 372–381. https://doi.org/10.1111/jcpp.13261

Wakschlag, L. S., Roberts, M. Y., Flynn, R. M., Smith, J. D., Krogh-Jespersen, S., Kaat, A. J., Gray, L., Walkup, J., Marino, B. S., Norton, E. S., & Davis, M. M. (2019). Future Directions for Early Childhood Prevention of Mental Disorders: A Road Map to Mental Health, Earlier. *Journal of Clinical Child and Adolescent Psychology*, *48*(3), 539–554.

https://doi.org/10.1080/15374416.2018.1561296

Wallisch, A., Little, L., Dean, E., & Dunn, W. (2020). Parent concerns: Differentiating developmental diagnoses in young children. *Research in Developmental Disabilities*, *103*(December 2019), 1–7. https://doi.org/10.1016/j.ridd.2020.103684

Warnick, E. M., Bracken, M. B., & Kasl, S. (2008). Screening efficiency of the child behavior checklist and strengths and difficulties questionnaire: A systematic review. *Child and Adolescent Mental Health*, *13*(3), 140–147. https://doi.org/10.1111/j.1475-3588.2007.00461.x

Weisz, J. R., Chorpita, B. F., Frye, A., Ng, M. Y., Lau, N., Bearman, S. K., Ugueto, A. M., Langer, D. A., & Hoagwood, K. E. (2011). Youth top problems: Using idiographic, consumer-guided assessment to identify treatment needs and to track change during psychotherapy. *Journal of Consulting and Clinical Psychology*, *79*(3), 369–380. https://doi.org/10.1037/a0023307

Weitzman, C. C., Edmonds, D., Davagnino, J., & Briggs-Gowan, M. (2011). The association between parent worry and young children's social-emotional functioning. *Journal of Developmental and Behavioral Pediatrics*, *32*(9), 660–667. https://doi.org/10.1097/DBP.0b013e31822bc76b

Wichstrøm, L., Berg-Nielsen, T. S., Angold, A., Egger, H. L., Solheim, E., & Sveen, T. H. (2012). Prevalence of psychiatric disorders in preschoolers. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *53*(6), 695–705. https://doi.org/10.1111/j.1469-7610.2011.02514.x

Wilson, B. N., Neil, K., Kamps, P. H., & Babcock, S. (2013). Awareness and knowledge of developmental co-ordination disorder among physicians, teachers and parents. *Child: Care, Health and Development*, *39*(2), 296–300. https://doi.org/10.1111/j.1365-2214.2012.01403.x

World Health Organization. (2013). Mental Health Action Plan 2013-2020. In *World Health Organization*. https://doi.org/10.1207/s15327752jpa8601_03

Youngstrom, E. A. (2013). Future Directions in Psychological Assessment: Combining Evidence-Based Medicine Innovations with Psychology's Historical Strengths to Enhance Utility. *Journal of Clinical Child and Adolescent Psychology*, *42*(1), 139–159. https://doi.org/10.1080/15374416.2012.736358

Zablotsky, B., Black, L. I., Maenner, M. J., Schieve, L. A., Danielson, M. L., Bitsko, R. H., Blumberg, S. J., Kogan, M. D., & Boyle, C. A. (2019). Prevalence and trends of developmental disabilities among children in the United States: 2009–2017. *Pediatrics*, *144*(4), 2009–2017. https://doi.org/10.1542/peds.2019-0811

Zablotsky, B., States, U., Colpe, L. J., States, U., Pringle, B. A., States, U., Kogan, M. D., Bureau, C. H., States, U., Rice, C., States, U., Blumberg, S. J., & States, U. (2018). *HHS Public Access*. *122*(1), 49–61. https://doi.org/10.1352/1944-7558-122.1.49.Age

Article 2

Titre

Early detection of mental disorders in child psychiatry: the accuracy of parental concerns

Contribution des auteurs

Florence Valade : Revue de la littérature, conceptualisation de l'étude, collecte de données, analyses statistiques, interprétation des résultats et rédaction du manuscrit.

Marie-Julie Béliveau : Conceptualisation de l'étude, interprétation des résultats et révision du manuscrit

Chantale Breault : Révision du manuscrit

Fannie Labelle : Révision du manuscrit

Early detection of mental disorders in child psychiatry: the accuracy of parental concerns

Abstract

Background: Based on available research results, it is still unclear whether the accuracy of parental concern (PC) to detect mental disorders varies depending on the child's disorder(s) or if it is influenced by child's age. Objectives: This paper aims to document sensitivity and specificity of different PC, determine whether specific diagnoses are predicted by specific PC and measure if child age contributes to the prediction. Methods: This retrospective study was conducted among a sample of 574 preschool-aged children referred to child psychiatry services (mean age 47 months, 73% boys). Sensitivity and specificity of five different PC were analyzed. Logistic regressions measured the predictive value of PC on their corresponding diagnosis, while controlling for child age. Results: PC sensitivity ranged from 7% to 72%, while sensitivity ranged from 57% to 97%. Most frequent and accurate PC were about language and predicted presence of both language and motor problems. Language and behaviour PC predicted their corresponding diagnosis with medium to large effects. Only 7% of children with developmental coordination disorder had parents who were concerned about their motor development, whereas this disorder was the most frequent diagnosis (57%) in our sample. Child age did not meaningfully contribute to any of the predictions. Conclusions: PC provide relevant information in the detection of MD for preschool children in child psychiatry and should be included more systematically in the assessment process to improve their care trajectory.

Keywords: Parental concern, mental disorders, early detection, child psychiatry, preschool.

Introduction

Mental health problems affect children of all ages, including preschool-aged children. Due to the number of developmental changes intrinsic to the preschool period, parents and health practitioners might consider some difficulties as a normal or transitory occurrence. Yet mental disorders (MD) are frequent, even in early childhood, affecting one in five children under the age of seven (Vasileva et al., 2021). Moreover, child psychopathology has been shown to be relatively stable (Dougherty et al., 2015; Halperin & Marks, 2019). For instance, a literature review reports that the presence of a psychiatric diagnosis in preschool-aged children is associated with significant problems in later childhood and adolescence (Dougherty et al., 2015). However, of all children under six years-old with MD, only 10-21% access general health services and even less (0-16%) access specialized mental health services (Oh et al., 2015). This discrepancy can potentially be explained by the belief that preschool children are too young for an assessment of social and emotional problems (Alexander et al., 2013; Wakschlag et al., 2019). Thus, service utilization for young children is highly dependant on parent's concerns about their child development (Horwitz, Gary, et al., 2003; Le et al., 2017). In accordance with findings suggesting that parents provide important information about their child's difficulties (Chung et al., 2011; Deakin-Bell et al., 2013), the American Academy of Pediatrics (2020) recommended that practitioners consider parents' concerns in early childhood surveillance, but a gaps still lie between research and practice.

Research on the utility of parental concern (PC) in identifying mental disorders (MD) has predominantly centered on isolated examinations of specific disorders, such as autism spectrum disorder (ASD; Tran et al., 2021; Zablotsky et al., 2019), language disorders (Skeat et al., 2014; Smolla et al., 2018), and behavioral disruptive problems (Godoy et al., 2014). These studies

typically compare these specific disorders to the absence of MD. Notably, the differentiation potential of PC across various MD has only been investigated in one study (Wallisch et al., 2020).

Despite notable advancements in developmental surveillance for children with developmental and behavioral disorders reported by the American Academy of Pediatrics (2020) over the past decade, the existing literature underscores persistent challenges. A recent investigation drawing from the American Academy of Pediatrics Periodic Survey brings to light a significant obstacle acknowledged by pediatricians when employing standardized instruments for screening developmental delay or ASD in young children — time limitations. This finding indicates a need for more comprehensive exploration of the practicality and feasibility of implementing PC in clinical settings. Furthermore, the broader question remains unanswered in clinical referral settings: Can PC effectively distinguish young children's needs and potentially provide valuable support in the diagnostic process? The current literature lacks a conclusive answer to this critical query, emphasizing the need for further investigation.

The use of PC as an accessible and cost-effective tool for screening and referral in clinical practice is yet to be fully realized. This underscores a gap in the literature, prompting the exploration of the practical implications and implementation challenges of leveraging PC for ensuring that young children receive timely and appropriate clinical services, minimizing the necessity for prolonged assessments. Moreover, an essential aspect is determining whether specific categories of difficulties are less discernible to parents, necessitating a closer monitoring focus by health organizations.

What is the extent of mental disorders in early childhood?

According to the World Health Organisation (2013), MD are generally characterized by a combination of abnormal thoughts, perceptions, emotions, behaviours, and relationships with

others, which include behavioural and developmental disorders with onset occurring in early childhood. A recent meta-analysis of international prevalence of general MD reported an overall rate of 20.1% among children aged between one and seven years old with oppositional defiant disorder (4.9%), attention-deficit/hyperactivity disorder (ADHD; 4.3%) and anxiety disorders (8.5%) as the most common (Vasileva et al, 2021). Although many epidemiological studies document ADHD prevalence, most do not include other neurodevelopmental disorders, such as developmental language disorder (DLD) or developmental coordination disorder (DCD), despite their high rates of prevalence in early childhood, ranging from 5% to 7.5% (Blank et al., 2019; Norbury et al., 2016). According to community-based studies, approximately 11 % of young children are diagnosed with a neurodevelopmental disorder (Chen et al., 2020; Zablotsky et al., 2019), but rates reported in clinical samples of children referred to mental health services are much higher (B. H. Hansen et al., 2018; Valade et al., 2022). Neurodevelopmental disorders often co-occur, and elevated comorbidity between neurodevelopmental disorders and emotional or behavioral problems has been documented in empirical studies (Hollo et al., 2014). Moreover, there is growing evidence of frequent comorbidity in early childhood psychopathology from epidemiological (Dougherty et al., 2015; Vasileva et al., 2021) and clinical samples. Children with problems in various spheres of development tend to show greater stability and severity of psychopathology. It is therefore necessary to consider co-occurrence of MD in early detection while it has been rarely documented (Chung et al., 2011; Wallisch et al., 2020). In the present study, the high incidence of variety of disorders on children consulting in psychiatric clinics will be considered, which is essential to ensure a good match between the needs of children and the services they are offered (Youngstrom, 2013).

How do parental concerns influence service seeking and utilization in child health?

PC has been associated with service seeking and service utilization. For instance, parents who are concerned about their child are more likely to consider consulting a healthcare provider; parental worry about socio-emotional and language development or behavioral health has been strongly associated with speaking to a provider about those concerns (Ellingson et al., 2004).

Among community samples, about a third of parents reported being concerned about at least one area of development in their child (Godoy et al., 2014; Weitzman et al., 2011). Most PC for young children relate to behavior, language or social-emotional development (Gleason et al., 2010; Godoy et al., 2014). By documenting the sensitivity and specificity of PC, this study will help determine the importance health services should give to the concerns reported by parents and the weight they could take in the guidance offered. Optimal use of PC could lead to faster services and replace long delays caused by expensive assessments.

Does child age have an impact on parental concern?

For some clinical presentation, such as behavior problems, PC is more frequent in older children, independently of their symptoms (Godoy et al., 2014). For instance, almost a third of a sample of parents with younger children who obtained extreme scores on the CBCL were not worried, or were only slightly worried, about their child's emotional or behavioral health (Briggs-Gowan et al., 2001). Moreover, parents of younger children who were concerned about language development and behavioral health were less likely to receive further care after consulting a healthcare provider than parents with older children (Godoy et al., 2014).

Considering the numerous developmental changes in early childhood, some might fear giving too much weight to parental concerns about problems that could quickly be resolved and therefore clog services unnecessarily. In order to address this question, the present study will help

determine if parents are good at detecting difficulties severe enough to warrant medical attention independently of child age.

Is parental concern sensitive and specific to child diagnosis?

The guidance provided by the American Academy of Pediatrics (2006) suggests that developmental screening instruments should uphold sensitivity and specificity rates exceeding 70%. Sensitivity refers to the percentage of correctly identified children with a diagnosis, while specificity pertains to the percentage of accurately identified children without a diagnosis (Trevethan, 2017). Although there are indications that employing PC could be an effective and comprehensive developmental screening tool for certain diagnoses, it is imperative to establish the reliability of PC in detecting issues significant enough to result in a diagnosis among preschool-aged children.

Chung et al. (2011) reported that PC, especially in language and motor development, were good predictors of children with language or motor delays (sensitivity 81% and 83%; specificity 94% and 86%, respectively) in children aged between one to four years old. Yet, other PC, such as those relating to attention or hyperactivity, have been found to be less predictive of an actual problem in a community-based sample (Ford et al., 2005). Glascoe (2003) reported that the accuracy of parental concerns in predicting actual mental health status was lower for children aged under 4 ½ years old (Sensitivity 68%; Specificity 66%) in comparison to older children (Sensitivity 87%; Specificity 79%). Among a clinical sample, Smolla et al. (2015) reported higher values for specificity (88.5%) and specificity (91.5%) in a sample of younger children aged between 3 and 5 years old whose parents were concerned about language development.

A more recent study found that for children aged between 3 and 6 years old, the types of concerns reported by parents prior to the diagnostic assessment often align with the final

diagnostic criteria Wallisch et al. (2020). For example, parents of children with ASD are more likely to be preoccupied with social interactions and language, which are part of the criteria for making the diagnosis. They conclude that parental concerns are a good screening tool for MD in young children. However, this study shows an overrepresentation of children with an ASD diagnosis, which questions the generalizability of the results to other clinical groups of young children.

Similarly, there is a high rate of reliability between the scales of The Child Behavior Checklist 1.5/5 years (CBCL 1 ½ - 5; Achenbach & Rescorla, 2000) and actual psychological diagnosis in preschool-aged children (Warnick et al., 2008). However, the reliability of qualitative answers to the open-ended structured questions included in the CBCL 1 ½ - 5 has not been studied. Since the CBCL 1 ½ - 5 is so commonly used and even routinely administered as part of several assessments, documenting the usefulness of parental reports to open-ended questions could point to a useful and easily available tool for early detection in clinical settings. If proven accurate, the information contained in this section of the questionnaire could improve the assessment process by simplifying and helping to quickly direct children at risk towards early intervention, while minimizing the costs of care. Although we routinely ask parents for their reasons for consulting, very little is known about the extent to which they could be used in a structured algorithm towards medical diagnosis.

Based on available research results, it is still unclear whether psychometric properties of PC vary depending on the child's disorder(s) and child's age. To our knowledge, very few studies measured PC as part of a clinical assessment to explore these questions in an ecological context.

The current study

This retrospective study aims to address existing gaps in the understanding of mental health concerns in preschool-aged children. By scrutinizing the sensitivity and specificity of various PC within a sample referred to a psychiatric clinic, this article aims to provide valuable insights into the predictive efficacy of specific concerns for different diagnoses. Moreover, an exploration of the potential influence of child age on these predictions is conducted. Through these investigations, this article aims to contribute to the improvement of the diagnostic process and illuminate the reliability of PC as an early detection tool in clinical settings. We hypothesize that (1) language and behavioural concerns will have higher sensitivity and specificity than other types of concerns, and (2) each diagnosis will be predicted by their corresponding PC. We will explore the impact of the child's age on this prediction in an exploratory manner, considering the divergent results reported in the scientific literature.

Methods

Participants

Data were extracted from hospital records of an early childhood psychiatric clinic providing services to young children referred in psychiatry in a large metropolitan area. Most participants were referred to the clinic following a consultation with their general health practitioner or pediatrician or from a mental health/health professional (e.g. a social worker, a nurse, psychiatrist from another establishment). The Research Ethics Board of the institution authorized access to the clinical records of all patients assessed at the clinic. Each participants' medical file was reviewed by research assistants to extract variables of interest. Children files without a completed CBCL 1 ½ - 5 questionnaire *(n* = 319) or a psychiatric assessment (*n* = 32) were excluded from the sample. The current study includes 574 participants assessed between 2006 and 2016, with most of the sample consisting of young males (73%; *n* = 421). Participants

were on average 47 months old (*SD* = 14; Min = 18; Max = 72) at the time of their pre-assessment (CBCL completion) and 60 months old at their final psychiatric assessment (*SD* = 17; Min = 15; Max = 138).

Measures

Parental Concern. The Child Behavior Checklist 1.5/5 years (CBCL; Achenbach & Rescorla, 2000) was systematically sent to parents before the first appointment. This widespread, validated, and standardized parent-report measures behavioral, emotional, and social problems in young children. PC were measured from parents' answers in the CBCL 1 ½ - 5 to the following open-ended question: "What is your worst concern regarding your child?". All answers were analyzed to create categories. Retained categories in the present study are presented in Table 1 with examples of the most frequently listed parental concerns. In the case of more than one concern, each was classified in the corresponding category. Thus, each participant could present a PC in more than one category. Research assistants coded each parental concern as belonging to a category or not, with an 85% overall agreement.

Table 1. Parental concern categories with examples

Category	**Examples of frequent parental concern**	**N (%)**
Language	Language Delay	337 (59)
Motor	Fine motor skills Gross motor skills	30 (5)
Attention and hyperactivity	Hyperactivity Constantly moving Concentration problems Impulsivity	98 (17)
Behavioral	Anger Aggressive/violent behavior Frequent tantrums	138 (24)
Internalized problems	Anxiety Selective mutism	81 (14)

Psychiatric Diagnoses. Mental disorder diagnoses issued following a psychiatrist assessment were extracted from patients' medical files. The diagnostic assessment process was initiated when a parent requested an evaluation for their child following a medical referral. Questionnaires, including a Pre-registration Questionnaire designed to gather general information about the child's family, and the CBCL 1½-5 years (Achenbach & Rescorla, 2000), were then sent to the parent. A meeting was subsequently scheduled for the child's evaluation by the psychiatrist. During this meeting, the psychiatrist issued diagnoses based on the criteria of the DSM-IV-TR (APA, 2000) which was the valid system at the time. When necessary, the psychiatrist requested additional multidisciplinary assessments (e.g., speech- language pathologist assessment, occupational therapy assessment, psychological assessment) to refine the child's diagnosis. The conclusions from various assessments were integrated and presented to families in follow-up appointments. For some families, up to two assessments were needed after the initial evaluation to issue final diagnoses. In the present study, the final assessment in the evaluation process was considered and five diagnoses were included: developmental language disorder (DLD), developmental coordination disorder (DCD), attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), and anxiety disorders. Following the CATALISE (Bishop et al., 2016) and DSM-5-TR (American Psychiatric Association, 2022) criteria, children who received a diagnosis of language disorder but who were also diagnosed with ID, ASD, hearing impairment, or biomedical problems such as epilepsy or cerebral palsy were excluded from the DLD group, as were children with a speech disorder.

Data analyses

Analyses were conducted in IBM SPSS Statistics version 28.0. Sensitivity and specificity of PC with their corresponding diagnoses were computed in a 2x2 table. Levels of 70% or more

for sensitivity and specificity established by the American Academy of Pediatrics (2006) were considered acceptable in the present study. Sensitivity and specificity levels were measured for each PC and their corresponding diagnosis. Five logistic regressions measured the predicting value of all PC on each diagnosis, with child age as a control variable. Explained variance was measured using Nagelkerke pseudo-R^2.

Results

Descriptive statistics

Participant characteristics are presented in Table 2. Children were on average 47 months old (*SD* = 14; Min = 18; Max = 72) at the time of their pre-assessment (CBCL completion) and 61 months old at their final psychiatric assessment (*SD* = 17; Min = 15; Max = 139). A delay of 14 months on average elapsed between the pre-assessment, when PC were measured, from the issuance of the final diagnosis. Parents reported between one and six concerns about their child's development, with a mean of two concerns, while number of diagnoses at the final psychiatric assessment ranged from 1 to 5, with an average of 3 diagnoses per child. Only 23% of the sample received their final diagnosis at their first evaluation, while 43% received it after a thorough assessment and 34% needed two follow-up assessments to refine their diagnosis.

Table 2. Participants characteristics

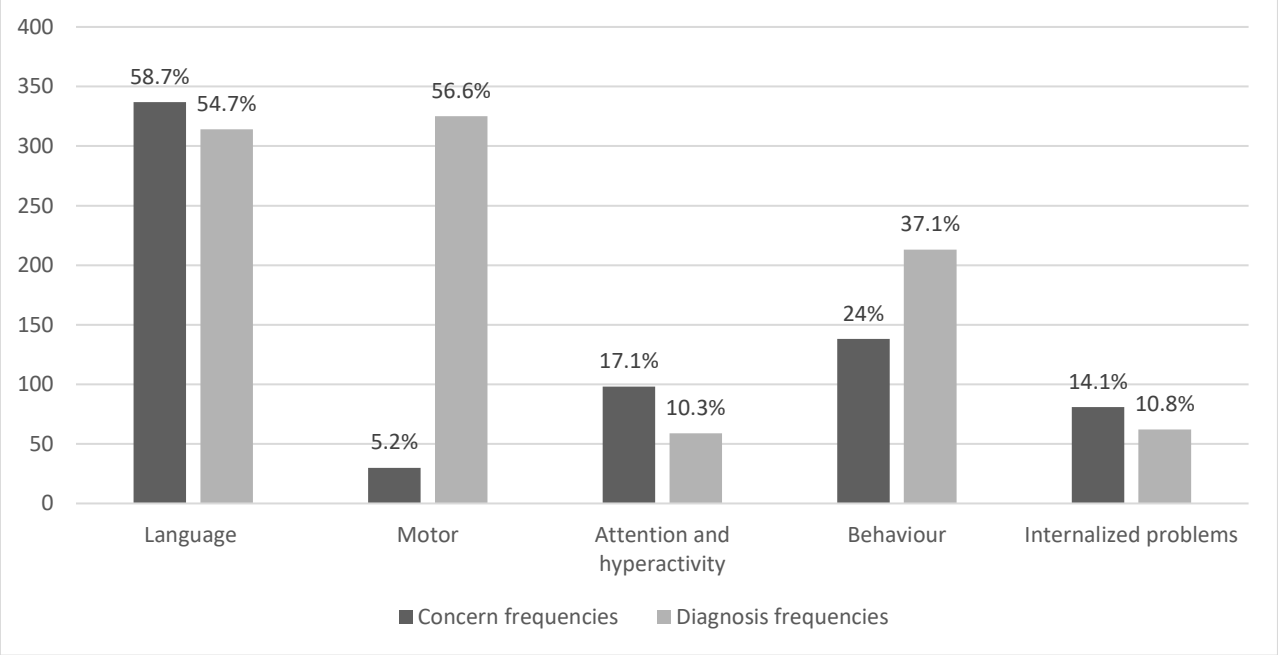
	Sample		
Characteristics	*n*	*%*	M (SD)
Gender	574	-	-
Boy	421	73.3	-
Girl	153	26.7	-
Age at CBCL completion (months)	555	-	46.63 (13.56)
Age at final diagnosis (months)	574	-	60,78 (16.91)
Clinical diagnoses	574	-	2.74 (1.05)

DLD	314	54.7	-
DCD	325	56.6	-
ADHD	59	10.3	-
ODD	213	37.1	-
Anxiety disorders	62	10.8	-
Parental concerns	574	-	2.00 (0.94)
Language	337	58.7	-
Motor	30	5.2	-
Attention and hyperactivity	98	17.1	-
Behavioral	138	24	-
Internalised problems	81	14.1	-

Note. *DLD= developmental language disorder; DCD = Developmental coordination disorder; ADHD = Attention-deficit/hyperactivity disorder; ODD = Oppositional defiant disorder.*

Figure 1 shows that most frequent concerns were language (58.7%) and behavioural problems (24%), while most frequent diagnoses were DCD (56.6%) and DLD (54.7%). The greatest correspondence gap lies between motor concerns and DCD diagnosis.

Figure 1. Histogram of diagnoses and parental concern frequencies



Sensitivity and specificity of parental concern

Sensitivity and specificity of five types of parental concerns were computed (Table 3). Language concerns were 72% sensitive to DLD diagnosis and 57% specific in correctly identifying children without DLD. Specificity of motor, attention and hyperactivity, behavioural and internalized disorders varied between 85% and 97%. Motor concerns were only 7% sensitive to DCD diagnosis while sensitivity of attention and hyperactivity, behavioural and internalized problems concerns ranged from 38% to 42%.

Table 3. Sensitivity and specificity of parental concern in the prediction of their corresponding diagnosis (n = 574)

Concern – Diagnosis	**Sensitivity (%)**	**Specificity (%)**
Language – DLD	72	57
Motor – DCD	7	97
Attention and hyperactivity – ADHD	39	85
Behaviour – ODD	38	84
Internalized problems – Anxiety disorders	42	89

Predictive Value of parental concern

Logistic regression analyses. To identify which concerns best predicted each diagnosis and to test whether PC have a differentiating value in predicting their child's diagnosis, five binomial logistic regressions were performed, entering all variables simultaneously in each regression model. The significance level was set at $p < .01$ with the Bonferroni method to control for multiple analyses.

Results from the logistic regressions (Tables 4 to 8) showed that, when controlling for child's age, the odds of having a DLD diagnosis were 3.31 times higher for children whose parents had language concerns. Language concerns also increased the odds of presenting DCD diagnosis by 2.30 times, while motor concern did not significantly contribute to the prediction of DCD. The odds of presenting an ADHD diagnosis were 3.19 times higher for parents who had

concerns regarding their child's attention and hyperactivity. The odds of presenting a diagnosis of ODD were 2.98 times higher for parents who had concerns regarding behaviour problems, while the odds of presenting a diagnosis of anxiety disorder were 4.80 times higher for parents who had concerns for internalized problems. Except for DCD, that was predicted by language concern only, the four other diagnoses were predicted specifically and exclusively by their corresponding concern. Language concerns predicted both DCD and DLD diagnosis. Although older child age significantly contributed to the prediction of ADHD and anxiety disorders, the associations were almost nil (OR between 1.05 and 1.06). Child age did not contribute to the predictions of DCD and ODD diagnoses, based on PC.

Table 4. Logistic regression examining PC predicting DLD (n = 574)

	B (S.E)	OR	95% CI for OR		
			LL	*UL*	*p*
Step 0: Control variable					
Child age	-.01(.01)	.99	.98	1.00	.09
Step 1: Parental concern					
Child age	.01(.01)	1.01	.99	1.02	.48
Language	1.24(.21)	3.45	2.29	5.20	<.01
Motor	.05(.44)	1.05	.44	2.49	.92
Attention and hyperactivity	.34(.26)	1.41	.87	2.28	.16
Behaviour	-.20(.22)	.82	.54	1.26	.37
Internalized problems	-.31(.26)	.73	.43	1.23	.24

Note. B= unstandardized regression weight; SE = standard error; OR = odds ratio; CI = confidence interval; LL = lower limit; UL = upper limit.

a. Variable entered on step 0. Child's age.

b. Variables entered on step 1. Language, Motor, Attention and hyperactivity, Behaviour, Internalized problems.

Table 5. Logistic regression examining PC predicting DCD (n = 574)

	B (S.E)	OR	95% CI for OR		
			LL	*UL*	*p*

Step 0: Control variable					
Child age	-.01(.01)	.99	.97	1.00	.10
Step 1: Parental concern					
Child age	-.00(.01)	1.00	.99	1.01	.87
Language	.84(.21)	2.30	1.54	3.44	<.01
Motor	.84(.49)	2.32	.89	6.06	.09
Attention and hyperactivity	.28(.24)	1.32	.83	2.12	.26
Behaviour	-.22(.21)	.81	.53	1.23	.31
Internalized problems	-.17(.26)	.84	.51	1.40	.51

Note. B= unstandardized regression weight; SE = standard error; OR = odds ratio; CI = confidence interval; LL = lower limit; UL = upper limit.

a. Variable entered on step 0. Child's age.

b. Variables entered on step 1. Language , Motor, Attention and hyperactivity, Behaviour, Internalized problems.

Table 6. Logistic regression examining PC predicting ADHD (n = 574)

	B (S.E)	OR	95% CI for OR		
			LL	*UL*	*p*
Step 0: Control variable					
Child age	.07(.01)	1.08	1.05	1.10	<.01
Step 1: Parental concern					
Child age	.05(.01)	1.06	1.04	1.09	<.01
Language	-1.07(.36)	.35	.17	.69	<.01
Motor	.02(.68)	.98	.26	3.68	.97
Attention and hyperactivity	1.17(.32)	3.24	1.72	6.08	<.01
Behaviour	-.12(.36)	.88	.44	1.77	.72
Internalized problems	-.32(.41)	.72	.33	1.62	.44

Note. B= unstandardized regression weight; SE = standard error; OR = odds ratio; CI = confidence interval; LL = lower limit; UL = upper limit.

a. Variable entered on step 0. Child's age.

b. Variables entered on step 1. Language, Motor, Attention and hyperactivity, Behaviour, Internalized problems.

Table 7. Logistic regression examining PC predicting ODD (n = 574)

	B (S.E)	OR	95% CI for OR		
			LL	*UL*	*p*

Step 0: Control variable					
Child age	-.01(.01)	.99	.98	1.01	.24
Step 1: Parental concern					
Child age	-.02(.01)	.99	.97	1.00	.05
Language	-.46(.21)	.63	.42	.96	.03
Motor	-.95(.57)	.39	.13	1.19	.10
Attention and hyperactivity	.56(.24)	1.74	1.08	2.80	.02
Behaviour	1.01(.22)	2.75	1.79	4.21	<.01
Internalized problems	-.20(.27)	.82	.48	1.41	.47

Note. B= unstandardized regression weight; SE = standard error; OR = odds ratio; CI = confidence interval; LL = lower limit; UL = upper limit.

a. Variable entered on step 0. Child's age.

b. Variables entered on step 1. Language , Motor, Attention and hyperactivity, Behaviour, Internalized problems.

Table 8. Logistic regression examining PC predicting anxiety disorders (n = 574)

	B (S.E)	OR	95% CI for OR		
			LL	*UL*	*p*
Step 0: Control variable					
Child age	.06(.01)	1.06	1.04	1.09	<.01
Step 1: Parental concern					
Child age	.05(.01)	1.05	1.02	1.08	<.01
Language	-.35(.34)	.70	.36	1.36	.30
Motor	.17(.62)	1.19	.35	4.00	.78
Attention and hyperactivity	.05(.37)	1.05	.51	2.20	.89
Behaviour	-.14(.34)	.87	.43	1.73	.69
Internalized problems	1.51(.32)	4.54	2.42	8.52	<.01

Note. B= unstandardized regression weight; SE = standard error; OR = odds ratio; CI = confidence interval; LL = lower limit; UL = upper limit.

a. Variable entered on step 0. Child's age.

b. Variables entered on step 1. Language , Motor, Attention and hyperactivity, Behaviour, Internalized problems.

Results of Nagelkerke pseudo-R2 analyses (Table 9) indicated that approximate explained variance of DLD (12%) and ODD (11%) predicted by their corresponding PC represented a

medium to large effect (Cohen, 1988), while all the other predictions presented a small to medium effect (Cohen, 1988).

Table 9. Explained variance of logistic regression models

Prediction model	(R^2_N)
Language concerns and DLD	.12
Motor concerns and DCD	.07
Attention and hyperactivity concerns and ADHD	.09
Behaviour concerns and ODD	.11
Internalized problems and anxiety disorders	.09

Note. R^2_N = Nagelkerke pseudo-R2

Discussion

This large retrospective study had three major objectives. It aimed to document PC sensitivity and specificity, to measure the predicting value of PC for each diagnosis and to determine the contribution of child age in the predictions in a large clinical cohort of 574 children. Most frequent concerns in our sample regarded language (58.7%) and behavioural problems (24%), while the most common diagnoses were DCD (56.6%) and DLD (54.7%).

Sensitivity and specificity of parental concerns

First, we hypothesized that language and behavioural concerns would have greater sensitivity and specificity than other types of concerns to detect their corresponding diagnosis. This was partially confirmed. Showing the higher rate of sensitivity (72%), language disorders were better detected by parents than other diagnoses. However, language concerns also showed lower specificity (57%) than all other diagnoses, indicating that several children whose parents worried for their language development were not diagnosed with DLD. Additional analyzes were conducted to clarify this overrepresentation. Among these children, 69.7% had a diagnosis of ID or ASD. Thus, in the detection of communication disorders more generally, including language disorders associated with a biomedical condition such as ID or ASD, sensitivity of language PC

reached 73% while specificity reached 70%. In this population of referred children, language PC may therefore be a significant transdiagnostic indicator and require a comprehensive assessment. This finding is congruent with results found by Wallisch et al. (2020), which demonstrated PC as a reliable tool to identify important diagnostic criteria.

In the case of motor problems, parents showed very little concern. Only 7% of children who received a DCD diagnosis had parents who were concerned about their motor development, whereas DCD diagnosis was the most frequent (57%) in this cohort. These findings are similar to previous reports indicating low sensitivity (21-47%) and high specificity (89-96%) of the Ages and Stages Questionnaire-Third Edition motor scales to detect children at risk for DCD in a community-based sample of preschoolers (King-Dowling et al., 2016). These results could partially be explained the fact that DCD is an underrecognized disorder, both by parents and by health professionals (Blank et al., 2019). This lack of awareness may prevent parents from detecting this disorder but may also reflect referral bias, considering these children are consulting for socioemotional and developmental problems in early childhood psychiatry.

Although behavioral concerns were the second most common PC, they showed low sensitivity (38%) and high specificity (84%), which means that many parents of children with an ODD diagnosis did not express behavioural concerns, but that the absence of diagnosis was correctly identified by most parents. Similarly, attention/ hyperactivity and internalized problems concerns had lower sensitivity (ranging from 39% to 42%) and higher specificity (ranging from 85% to 89%). In sum, all PC, except from language, seem to have greater precision in excluding children without diagnoses than in accurately identifying those who have them.

Predictive value of parental concerns

We hypothesized that each type of PC would specifically and differentially predict their corresponding diagnostic category. This hypothesis was also partially confirmed. Results of the logistic regressions showed that PC for language and behavioral problems were good predictors of children diagnosis, with a medium to large effect. ADHD and internalized problem concerns also showed a good differentiating predictive value but presented lower rates of explained variance. Language concerns, rather than motor concerns, predicted DCD, indicating that motor concerns were poor indicators for DCD diagnosis. Considering that 64% of participants presented two or more diagnoses, this result could be explained by the high rates of comorbidity between DLD and DCD (Flapper & Schoemaker, 2013). Our results do not allow to discriminate the influence of comorbidity, yet they underline the importance of better documenting disorder co-occurrence by comparing clinical groups in future studies. Finally, we explored the impact of the child's age on these predictions in an exploratory manner. Child age did not meaningfully add to the prediction of diagnosis based on PC. This suggests that PC is a reliable indicator in detecting MD in preschool children consulting in child psychiatry. We conclude that PC should be used to refer children at risk more rapidly to early intervention services, especially since the assessment process takes on average 14 months in our sample, which implies that children might be left without services at a pivotal moment in their development.

In sum, parents whose children are referred to child psychiatry services show many concerns and are mostly worried about their child’s language and behavior. Their concerns for language, behavior, attention and hyperactivity and internalized problems are significantly associated with the diagnosis their child will receive. However, the majority had not detected or were not preoccupied by their child’s motor coordination problems. Language problems are better

detected by parents than other disorders, but they are the least specific, as they can be associated with other diagnoses than DLD. Our results do support that both language and motor skills should be further investigated when parents express language concerns.

Limitations and Strengths of the Study

A primary limitation in this study relates to the measurement of PC. An inconsistency emerged in the reported number of concerns compared to the formulation of the question, "What is your worst concern regarding your child?" Despite the question not being designed for multiple answers, the majority (87%) of parents expressed two or more concerns, hinting at the potential burden felt by parents and the intricacy of their child's issues. The inability to hierarchically order concerns based on parental perceptions, coupled with variability in the frequencies of different types of PC, may have influenced the results. Notably, an under-representation of PC related to motor development could have compromised the statistical power of this variable in regression analyses, potentially preventing it from reaching the established significance level.

Moreover, the diverse range of difficulties encountered by the children in our sample limits the ability to discern the predictive impact of PC on specific disorders. The common limitation of overlooking participants' comorbidities, as seen in various studies (Vasileva et al., 2021; Wallisch et al., 2020), is addressed in our study, which highlights the myriad diagnoses found in child psychiatry, reflecting the complexity of this clinical population. To gain a more comprehensive understanding of PC in MD, further studies considering comorbid disorders are crucial. This may indicate a referral bias where certain consultation motives are prioritized over others, potentially influenced by the severity of symptoms from the parent's perspective. As noted by Ellingson et al. (2004), their study revealed that PC, identified as a robust predictor of help-seeking, was more likely among parents facing challenges such as low child competence and

disruptions in family routines due to the child's behavior. Furthermore, parental variables that may influence the sensitivity and specificity of their concerns (e.g., parents' mental health, age, education level, support network) should also be investigated in future studies. To validate the applicability of our findings, this exploratory study should be replicated in diverse clinical settings, encompassing children with various types of MD, thus establishing its utility as a psychiatric surveillance tool.

Despite these limitations, a major strength of our study lies in its ecological validity due to its clinical sample. The large sample size likely represents children who are referred to early childhood psychiatry services and the width of our database allowed to consider many PC. Our findings also improve our current understanding of the utility of PC, by comparing them among disorders. This integrative and wider perspective about MD is innovative and allows to demonstrate that some PC do discriminate among clinical groups, which cannot be verified when no clinical comparison groups are included. Such studies are of paramount importance to properly plan and organize services in alignment with the needs of the consulting children.

Clinical implications

PC as a screening test for MD in child psychiatry failed to fully meet guidelines for adequate psychometric properties, yet results were similar to results found with developmental screening instruments. Even when using different types of standardized questionnaires in paediatric care, sensitivities ranged from 14% to 54%, and specificities ranged from 69% to 100% (Sheldrick et al., 2011). Thus, PC in child psychiatry could be regarded has similar in accuracy to regular screening tests.

Our results highlight the importance of including parents' perceptions in the consultation process. Although PC is not sufficient to establish a diagnosis, it is a significant indicator that

should be included in the assessment process and in the orientation towards adapted services. Collecting parental perceptions must also be an ongoing process to ensure that the services offered are adequate and effective and favour adequacy between health professionals and parents. These factors have significant repercussions not only for detection, diagnosis, referral, obtaining services, but also on alliance and treatment adherence.

Combining PC and other markers, including risk factors, could lead to the development of algorithms for enhanced detection. These models, with heightened sensitivity and specificity, would streamline the detection and referral process, ensuring no child is overlooked. Given the evidence supporting the positive impact of early intervention on developmental outcomes (Institut national d'excellence en santé et en services sociaux, 2021), and considering the comparable accuracy of PC and screening tests in certain clinical contexts, we propose that PC, aligned with recent recommendations by the American Academy of Pediatrics (2020), could serve as a cost-effective, efficient, and valuable tool, systematically integrated into child surveillance.

In the present study, we conclude that PC is useful to detect DLD, ADHD, ODD and anxiety disorders among preschool children consulting in child psychiatry regardless of the age of the child.

In this study, we assert that PC serve as a pertinent indicator for identifying DLD, ADHD, ODD, and anxiety disorders in preschool children seeking consultation in child psychiatry, irrespective of the child's age. Our findings underscore the imperative of implementing preventive initiatives to enhance awareness and early detection of DCD. The notably low utilization of specialized mental health services by preschoolers with mental health disorders, given their high prevalence and substantial negative impact on both the children and their families, represents a significant public health concern. Enhancing understanding and utilization

of PC during early child development stages could prove pivotal in improving long-term outcomes and prognosis, facilitating prompt interventions while mitigating the need for extensive assessments. Advocating for the systematic integration of PC in the clinical assessment of mental health disorders supports a collaborative approach with parents, acknowledging their invaluable insight into their child's well-being.

References

Achenbach, T. M., & Rescorla, M. A. (2000). *Manuel of the Child Behavior Checklist 1.5/5 years*. University of Vermont, Research Center for Children, Youth, and Families.

Alexander, K. E., Brijnath, B., & Mazza, D. (2013). "Can they really identify mental health problems at the age of three?" Parent and practitioner views about screening young children's social and emotional development. *Australian and New Zealand Journal of Psychiatry*, *47*(6), 538–545. https://doi.org/10.1177/0004867413476756

AlHammadi, F. S. (2017). Prediction of child language development: A review of literature in early childhood communication disorders. *Lingua*, *199*, 27–35. https://doi.org/10.1016/j.lingua.2017.07.007

American Psychiatric Association. (2022). *Manuel diagnotic et statistique des troubles mentaux* (5e édition). https://doi.org/https://doi.org/10.1176/appi.books.9780890425596

Andersson, K., Hansson, K., Rosqvist, I., Åhlander, V. L., Sahlén, B., & Sandgren, O. (2019). The contribution of bilingualism, parental education, and school characteristics to performance on the clinical evaluation of language fundamentals: Fourth edition, Swedish. *Frontiers in Psychology*, *10*, 1–7. https://doi.org/10.3389/fpsyg.2019.01586

Astle, D. E., Holmes, J., Kievit, R., & Gathercole, S. E. (2022). Annual Research Review: The transdiagnostic revolution in neurodevelopmental disorders. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *63*(4), 397–417. https://doi.org/10.1111/jcpp.13481

Bellman, M., Byrne, O., & Sege, R. (2013). Developmental assessment of children. *BMJ (Online)*, *345*(7891), 1–9. https://doi.org/10.1136/bmj.e8687

Benner, G. J., Nelson, J. R., & Epstein, M. H. (2002). Language skills of children with EBD: A literature review. *Journal of Emotional and Behavioral Disorders*, *10*(1), 43–59. https://doi.org/10.1177/106342660201000105

Bishop, D., Clark, B., Conti-Ramsden, G., Norbury, C. F., & Snowling, M. J. (2012). RALLI: An internet campaign for raising awareness of language learning impairments. *Child Language Teaching and Therapy*, *28*(3), 259–262. https://doi.org/10.1177/0265659012459467

Bishop, D., Snowling, M. J., Thompson, P. A., & Greenhalgh, T. (2017). Phase 2 of CATALISE: A multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. https://doi.org/10.1111/jcpp.12721

Bishop, D., Snowling, M. J., Thompson, P. A., Greenhalgh, T., Adams, C., Archibald, L., Baird, G., Bauer, A., Bellair, J., Boyle, C., Brownlie, E., Carter, G., Clark, B., Clegg, J., Cohen, N., Conti-Ramsden, G., Dockrell, J., Dunn, J., Ebbels, S., … Whitehouse, A. (2016). CATALISE: A multinational and multidisciplinary Delphi consensus study. Identifying language impairments in children. *Plos One*, *11*(7), 1–26. https://doi.org/10.1371/journal.pone.0158753

Bishop, D., Snowling, M., Thompson, P., Greenhalgh, T., Adams, C., Archibald, L., Baird, G., Bauer, A., Bellair, J., Boyle, C., Brownlie, E., Carter, G., Clark, B., Clegg, J., Cohen, N., Conti-Ramsden, G., Dockrell, J., Dunn, J., Ebbels, S., … House, A. (2017). Phase 2 of CATALISE: a multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *58*(10), 1068–1080. https://doi.org/10.1111/jcpp.12721

Blank, R., Barnett, A. L., Cairney, J., Green, D., Kirby, A., Polatajko, H., Rosenblum, S., Smits-Engelsman, B., Sugden, D., Wilson, P., & Vinçon, S. (2019). International clinical practice recommendations on the definition, diagnosis, assessment, intervention, and psychosocial aspects of developmental coordination disorder. *Developmental Medicine and Child Neurology*, *61*(3), 242–285. https://doi.org/10.1111/dmcn.14132

Breault, C., Béliveau, M. J., Labelle, F., Valade, F., & Trudeau, N. (2023). Stability of language difficulties among a clinical sample of preschoolers. *International Journal of Language and Communication Disorders*, *58*(1), 138–153. https://doi.org/10.1111/1460-6984.12776

Briggs-Gowan, M. J., Carter, A. S., Bosson-Heenan, J., Guyer, A. E., & Horwitz, S. M. (2006). Are Infant-Toddler Social-Emotional and Behavioral Problems Transient ? *Journal of the American Academy of Child & Adolescent Psychiatry*, *45*(7), 849–858. https://doi.org/10.1097/01.chi.0000220849.48650.59

Briggs-Gowan, M. J., Carter, A. S., Skuban, E. M., & Horwitz, S. M. C. (2001). Prevalence of social-emotional and behavioral problems in a community sample of 1- and 2-year-old children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *40*(7), 811–819. https://doi.org/10.1097/00004583-200107000-00016

Brignell, A., Williams, K., Jachno, K., Prior, M., Reilly, S., & Morgan, A. T. (2018). Patterns and Predictors of Language Development from 4 to 7 Years in Verbal Children With and Without Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, *48*(10), 3282–3295. https://doi.org/10.1007/s10803-018-3565-2

Bufferd, S. J., Dougherty, L. R., Carlson, G. A., Rose, S., & Klein, D. N. (2012). Psychiatric disorders in preschoolers: Continuity from ages 3 to 6. *American Journal of Psychiatry*,

169(11), 1157–1164. https://doi.org/10.1176/appi.ajp.2012.12020268

Campbell, T. F., Dollaghan, C. A., Rackette, H. E., Paradise, J. L., Feldman, H. M., Shriberg, L. D., Sabo, D. L., & Kurs-Lasky, M. (2003). Risk Factors for Speech Delay of Unknown Origin in 3-Year-Old Children. *Child Development*, *74*(2), 346–357. https://doi.org/10.1111/1467-8624.7402002

Capone Singleton, N. (2018). Late Talkers: Why the Wait-and-See Approach Is Outdated. *Pediatric Clinics of North America*, *65*(1), 13–29. https://doi.org/10.1016/j.pcl.2017.08.018

Caron, C., & Rutter, M. (1991). Comorbidity in Child Psychopathology: Concepts, Issues and Research Strategies. *Journal of Child Psychology and Psychiatry*, *32*(7), 1063–1080. https://doi.org/10.1111/j.1469-7610.1991.tb00350.x

Charach, A., Mohammadzadeh, F., Belanger, S. A., Easson, A., Lipman, E. L., McLennan, J. D., Parkin, P., & Szatmari, P. (2020). Identification of preschool children with mental health problems in primary care: Systematic review and identification of preschool children with mental health problems in primary care: Systematic review and meta-analysis. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *29*(2), 76–105.

Chen, H. J., Hsin-Ju Ko, M., Li, S. T., Chiu, N. C., & Hung, K. L. (2020). Prevalence of preschool children developmental disabilities in northeastern Taiwan - Screening with Taipei City Developmental Screening Checklist for Preschoolers, 2nd Version. *Journal of the Formosan Medical Association*, *119*(7), 1174–1179. https://doi.org/10.1016/j.jfma.2020.02.001

Chow, J. C., & Wehby, J. H. (2018). Associations Between Language and Problem Behavior: a

Systematic Review and Correlational Meta-analysis. *Educational Psychology Review*, *30*(1), 61–82. https://doi.org/10.1007/s10648-016-9385-z

Chung, C. Y., Liu, W. Y., Chang, C. J., Chen, C. L., Tang, S. F. T., & Wong, A. M. K. (2011). The relationship between parental concerns and final diagnosis in children with developmental delay. *Journal of Child Neurology*, *26*(4), 413–419. https://doi.org/10.1177/0883073810381922

Collisson, B. A., Graham, S. A., Preston, J. L., Rose, M. S., McDonald, S., & Tough, S. (2016). Risk and protective factors for late talking: An epidemiologic investigation. *Journal of Pediatrics*, *172*, 168-174.e1. https://doi.org/10.1016/j.jpeds.2016.02.020

Conti-Ramsden, G., & Durkin, K. (2012). Language development and assessment in the preschool period. *Neuropsychology Review*, *22*(4), 384–401. https://doi.org/10.1007/s11065-012-9208-z

Conti-Ramsden, G., & Durkin, K. (2016). What Factors Influence Language Impairment? Considering Resilience as well as Risk. *Folia Phoniatrica et Logopaedica*, *67*(6), 293–299. https://doi.org/10.1159/000444750

Conti-Ramsden, G., & Durkin, K. (2017). Developmental Language Disorder. In D. Skuse, H. Bruce, & L. Dowdney (Eds.), *Child psychology and psychiatry: Frameworks for clinical training and practice* (pp. 307–313). Wiley Blackwell.

Conti-Ramsden, G., Durkin, K., Toseeb, U., Botting, N., & Pickles, A. (2018). Education and employment outcomes of young adults with a history of developmental language disorder. *International Journal of Language and Communication Disorders*, *53*(2), 237–255.

https://doi.org/10.1111/1460-6984.12338

Conti-Ramsden, G., Mok, P. L. H., Pickles, A., & Durkin, K. (2013). Adolescents with a history of specific language impairment (SLI): Strengths and difficulties in social, emotional and behavioral functioning. *Research in Developmental Disabilities*, *34*(11), 4161–4169. https://doi.org/10.1016/j.ridd.2013.08.043

Cree, R. A., Bitsko, R. H., Robinson, L. R., Holbrook, J. R., Danielson, M. L., Smith, C., Kaminski, J. W., Kenney, M. K., & Peacock, G. (2018). Health Care, Family, and Community Factors Associated with Mental, Behavioral, and Developmental Disorders and Poverty Among Children Aged 2–8 Years — United States, 2016. *MMWR. Morbidity and Mortality Weekly Report*, *67*(50), 1377–1383. https://doi.org/10.15585/mmwr.mm6750a1

Deakin-Bell, N., Walker, K., & Badawi, N. (2013). The accuracy of parental concern expressed in the Ages and Stages Questionnaire to predict developmental delay. *Journal of Paediatrics and Child Health*, *49*(2), 133–136. https://doi.org/10.1111/jpc.12084

Diepeveen, F. B., van Dommelen, P., Oudesluys-Murphy, A. M., & Verkerk, P. H. (2017). Specific language impairment is associated with maternal and family factors. *Child: Care, Health and Development*, *43*(3), 401–405. https://doi.org/10.1111/cch.12451

Dockrell, J., Ricketts, J., & Lindsay, G. (2012). Understanding speech, language and communication needs: Profiles of need and provision. In *Department for Education (DfE)* (Vol. 1, Issue November). https://dera.ioe.ac.uk/id/eprint/16322/1/DFE-RR247-BCRP4.pdf

Dougherty, L. R., Leppert, K. A., Merwin, S. M., Smith, V. C., Bufferd, S. J., & Kushner, M. R. (2015). Advances and directions in preschool mental health research. *Child Development*

Perspectives, *9*(1), 14–19. https://doi.org/10.1111/cdep.12099

Elbro, C., Dalby, M., & Maarbjerg, S. (2011). Language-learning impairments: A 30-year follow-up of language-impaired children with and without psychiatric, neurological and cognitive difficulties. *International Journal of Language and Communication Disorders*, *46*(4), 437–448. https://doi.org/10.1111/j.1460-6984.2011.00004.x

Ellingson, K. D., Briggs-Gowan, M. J., Carter, A. S., & Horwitz, S. M. (2004). Parent identification of early emerging child behavior problems: Predictors of sharing parental concern with health providers. *Archives of Pediatrics and Adolescent Medicine*, *158*(8), 766–772. https://doi.org/10.1001/archpedi.158.8.766

Farnesi, B. C., Newton, A. S., Holt, N. L., Sharma, A. M., & Ball, G. D. C. (2012). Exploring collaboration between clinicians and parents to optimize pediatric weight management. *Patient Education and Counseling*, *87*(1), 10–17. https://doi.org/10.1016/j.pec.2011.08.011

Flapper, B. C. T., & Schoemaker, M. M. (2013). Developmental Coordination Disorder in children with specific language impairment: Co-morbidity and impact on quality of life. *Research in Developmental Disabilities*, *34*(2), 756–763. https://doi.org/10.1016/j.ridd.2012.10.014

Ford, T., Sayal, K., Meltzer, H., Goodman, R., Ford, T., & Goodman, R. (2005). *Parental concerns about their child ' s emotions and behaviour and referral to specialist services : general population survey*. 1435–1436. https://doi.org/10.1136/bmj.38643.368692.681

Franck, L. S., & O'Brien, K. (2019). The evolution of family-centered care: From supporting parent-delivered interventions to a model of family integrated care. *Birth Defects Research*,

111(15), 1044–1059. https://doi.org/10.1002/bdr2.1521

Glascoe, F. P. (2003). *Parents' Evaluation of Developmental Status: How Well Do Parents' Concerns Identify Children With Behavioral and Emotional Problems? Frances*. *March*, 133–138.

Gleason, M. M., Zeanah, C. H., & Dickstein, S. (2010). Recognizing young children in need of mental health assessment: Development and preliminary validity of the early childhood screening assessment. *Infant Mental Health Journal*, *31*(3), 335–357. https://doi.org/10.1002/imhj.20259

Godoy, L., Carter, A. S., Silver, R. B., Dickstein, S., & Seifer, R. (2014). Infants and toddlers left behind: Mental health screening and consultation in primary care. *Journal of Developmental and Behavioral Pediatrics*, *35*(5), 334–343. https://doi.org/10.1097/DBP.0000000000000060

Gouvernement du Québec. (2022). *Plan d'action interministériel en santé mentale 2022-2026*. https://publications.msss.gouv.qc.ca/msss/fichiers/2021/21-914-14W.pdf

Halperin, J. M., & Marks, D. J. (2019). Practitioner Review: Assessment and treatment of preschool children with attention-deficit/hyperactivity disorder. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *60*(9), 930–943. https://doi.org/10.1111/jcpp.13014

Hammer, C. S., Morgan, P., Farkas, G., Hillemeier, M., Bitetti, D., & Maczuga, S. (2017). Late talkers: A population-based study of risk factors and school readiness consequences. *Journal of Speech, Language, and Hearing Research*, *60*(3), 607–626. https://doi.org/10.1044/2016_JSLHR-L-15-0417

Hansen, A., Telléus, G. K., Mohr-Jensen, C., & Lauritsen, M. B. (2021). Parent-perceived barriers to accessing services for their child's mental health problems. *Child and Adolescent Psychiatry and Mental Health*, *15*(1), 1–11. https://doi.org/10.1186/s13034-021-00357-7

Hansen, B. H., Oerbeck, B., Skirbekk, B., Petrovski, B. É., & Kristensen, H. (2018). Neurodevelopmental disorders: prevalence and comorbidity in children referred to mental health services. *Nordic Journal of Psychiatry*, *72*(4), 285–291. https://doi.org/10.1080/08039488.2018.1444087

Haque, M. M., Rabbani, M., Dipal, D. Das, Zarif, M. I. I., Iqbal, A., Schwichtenberg, A., Bansal, N., Soron, T. R., Ahmed, S. I., & Ahamed, S. I. (2021). Informing developmental milestone achievement for children with autism: Machine learning approach. *JMIR Medical Informatics*, *9*(6), 1–21. https://doi.org/10.2196/29242

Hollo, A., Wehby, J. H., & Oliver, R. M. (2014). Unidentified language deficits in children with emotional and behavioral disorders: A meta-analysis. *Exceptional Children*, *80*(2), 169–186. https://doi.org/10.1177/001440291408000203

Horwitz, S. M., Gary, L. C., Briggs-Gowan, M. J., & Carter, A. S. (2003). Do Needs Drive Services Use in Young Children? *Pediatrics*, *112*(6 I), 1373–1378. https://doi.org/10.1542/peds.112.6.1373

Horwitz, S. M., Irwin, J. R., Briggs-Gowan, M. J., Bosson Heenan, J. M., Mendoza, J., & Carter, A. S. (2003). Language Delay in a Community Cohort of Young Children. *Journal of the American Academy of Child & Adolescent Psychiatry*, *42*(8), 932–940. https://doi.org/10.1097/01.CHI.0000046889.27264.5E

Institut national d'excellence en santé et en services sociaux (INESSS). (2021). *Trajectoires de services menant à l'évaluation diagnostique des troubles neurodéveloppementaux chez les enfants de la naissance à sept ans*.

Katagiri, M., Ito, H., Murayama, Y., Hamada, M., Nakajima, S., Takayanagi, N., Uemiya, A., Myogan, M., Nakai, A., & Tsujii, M. (2021). Fine and gross motor skills predict later psychosocial maladaptation and academic achievement. *Brain and Development*, *43*(5), 605–615. https://doi.org/10.1016/j.braindev.2021.01.003

Kim, J. H., Davies, B., & Xu Rattanasone, N. (2022). Have You Heard of Developmental Language Disorder? An Online Survey. *Communication Disorders Quarterly*, *44*(4), 228–238. https://doi.org/10.1177/15257401221115822

King-Dowling, S., Rodriguez, M. C., Missiuna, C., & Cairney, J. (2016). Validity of the Ages and Stages Questionnaire to detect risk of Developmental Coordination Disorder in preschoolers. *Child: Care, Health and Development*, *42*(2), 188–194. https://doi.org/10.1111/cch.12314

Korpilahti, P., Kaljonen, A., & Jansson-Verkasalo, E. (2016). Identification of biological and environmental risk factors for language delay: The Let's Talk STEPS study. *Infant Behavior and Development*, *42*, 27–35. https://doi.org/10.1016/j.infbeh.2015.08.008

Le, H. A. N. D., Gold, L., Mensah, F., Eadie, P., Bavin, E. L., Bretherton, L., & Reilly, S. (2017). Service utilisation and costs of language impairment in children: The early language in Victoria Australian population-based study. *International Journal of Speech-Language Pathology*, *19*(4), 360–369. https://doi.org/10.1080/17549507.2016.1209559

Lipkin, P. H., Macias, M. M., & AAP COUNCIL ON CHILDREN WITH DISABILITIES, S. O. D. A. B. P. (2020). Promoting optimal development: Identifying Infants and Young Children With Developmental Disorders Through Developmental Surveillance and Screening. *Pediatrics*, *145*(1). https://doi.org/10.1542/PEDS.2019-3449

Locatelli, C., Onnivello, S., Antonaros, F., Feliciello, A., Filoni, S., Rossi, S., Pulina, F., Marcolin, C., Vianello, R., Toffalini, E., Ramacieri, G., Martelli, A., Procaccini, G., Sperti, G., Caracausi, M., Pelleri, M. C., Vitale, L., Pirazzoli, G. L., Strippoli, P., … Lanfranchi, S. (2021). Is the age of developmental milestones a predictor for future development in down syndrome? *Brain Sciences*, *11*(5). https://doi.org/10.3390/brainsci11050655

Loughan, A. R., & Perna, R. (2013). Early Developmental Delays: A Cross Validation Study. *Journal of Psychological Abnormalities in Children*, *01*(02), 1–5. https://doi.org/10.4172/2329-9525.1000105

Mash, E. J., & Hayden, E. P. (2014). Child Psychopathology A Developmental – Systems Perspective. In *Child Psychopathology* (pp. 3–72).

McEwen, B. S., & Stellar, E. (1993). Stress and the Individual: Mechanisms Leading to Disease. *Archives of Internal Medicine*, *153*(18), 2093–2101. https://doi.org/10.1001/archinte.1993.00410180039004

McKean, C., Mensah, F. K., Eadie, P., Bavin, E. L., Bretherton, L., Cini, E., & Reilly, S. (2015). Levers for language growth: Characteristics and predictors of language trajectories between 4 and 7 years. *PLoS ONE*, *10*(8), 1–21. https://doi.org/10.1371/journal.pone.0134251

Movahedazarhouligh, S. (2022). Evidence-Based, Empirically Supported, or Scientifically

Unsupported? An Overview of the Research to Practice Gap in Early Childhood Special Education. *Journal of Educational Studies and Multidisciplinary Approaches*, *2*(1), 37–51.

Muluk, N. B., Bayoğlu, B., & Anlar, B. (2014). Language development and affecting factors in 3- to 6-year-old children. *European Archives of Oto-Rhino-Laryngology*, *271*(5), 871–878. https://doi.org/10.1007/s00405-013-2567-0

Norbury, C. F., Gooch, D., Wray, C., Baird, G., Charman, T., Simonoff, E., Vamvakas, G., & Pickles, A. (2016). The impact of nonverbal ability on prevalence and clinical presentation of language disorder: evidence from a population study. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *57*(11), 1247–1257. https://doi.org/10.1111/jcpp.12573

Oh, E., Mathers, M., Hiscock, H., Wake, M., Oh, E., Mathers, M., Hiscock, H., Wake, M., Bayer, J., Oh, E., Mathers, M., Hiscock, H., Wake, M., & Bayer, J. (2015). Professional help seeking for young children with mental health problems. *Australian Journal of Psychology, 3*(67), 187–195. https://doi.org/10.1111/ajpy.12072

Parsons, S., Schoon, I., Rush, R., & Law, J. (2011). Long-term Outcomes for Children with Early Language Problems : Beating the Odds. *Children & Society*, *25*, 202–214. https://doi.org/10.1111/j.1099-0860.2009.00274.x

Peverill, M., Dirks, M. A., Narvaja, T., Herts, K. L., Comer, J. S., & McLaughlin, K. A. (2021). Socioeconomic status and child psychopathology in the United States: A meta-analysis of population-based studies. *Clinical Psychology Review*, *83*(October 2020). https://doi.org/10.1016/j.cpr.2020.101933

Putnick, D. L., Bornstein, M. H., Eryigit-Madzwamuse, S., & Wolke, D. (2017a). Long-Term

Stability of Language Performance in Very Preterm, Moderate-Late Preterm, and Term Children. *Journal of Pediatrics*, *181*, 74-79.e3. https://doi.org/10.1016/j.jpeds.2016.09.006

Putnick, D. L., Bornstein, M. H., Eryigit-Madzwamuse, S., & Wolke, D. (2017b). Long-Term Stability of Language Performance in Very Preterm, Moderate-Late Preterm, and Term Children Diane. *Physiology & Behavior*, *176*(12), 139–148. https://doi.org/10.1016/j.jpeds.2016.09.006.Long-Term

Radez, J., Reardon, T., Creswell, C., Lawrence, P. J., Evdoka-Burton, G., & Waite, P. (2021). Why do children and adolescents (not) seek and access professional help for their mental health problems? A systematic review of quantitative and qualitative studies. *European Child and Adolescent Psychiatry*, *30*(2), 183–211. https://doi.org/10.1007/s00787-019-01469-4

Reilly, S., Wake, M., Ukoumunne, O. C., Bavin, E., Prior, M., Cini, E., Conway, L., Eadie, P., & Bretherton, L. (2010). Predicting language outcomes at 4 years of age: Findings from early language in Victoria study. *Pediatrics*, *126*(6). https://doi.org/10.1542/peds.2010-0254

Rescorla, L., & Mirak, J. (1997). Normal language acquisition. *Seminars in Pediatric Neurology*, *4*(2), 70–76. https://doi.org/10.1016/S1071-9091(97)80022-8

Rinaldi, P., Bello, A., Simonelli, I., & Caselli, M. C. (2023). Is Specific Learning Disorder Predicted by Developmental Language Disorder? Evidence from a Follow-Up Study on Italian Children. *Brain Sciences*, *13*(4). https://doi.org/10.3390/brainsci13040701

Rudolph, J. M. (2017). Case history risk factors for specific language impairment: A systematic review and meta-analysis. *American Journal of Speech-Language Pathology*, *26*(3), 991–

1010. https://doi.org/10.1044/2016_AJSLP-15-0181

Sameroff, A. (2006). Child development. In A. Clarke-Stewart & J. Dunn (Eds.), *Families count: Effects on child and adolescent development* (pp. 53–76). Cambridge University Press. https://doi.org/https://doi.org/10.1017/CBO9780511616259.004

Sansavini, A., Favilla, M. E., Guasti, M. T., Marini, A., Millepiedi, S., Di Martino, M. V., Vecchi, S., Battajon, N., Bertolo, L., Capirci, O., Carretti, B., Colatei, M. P., Frioni, C., Marotta, L., Massa, S., Michelazzo, L., Pecini, C., Piazzalunga, S., Pieretti, M., … Lorusso, M. L. (2021). Developmental language disorder: Early predictors, age for the diagnosis, and diagnostic tools. A scoping review. *Brain Sciences*, *11*(5), 1–38. https://doi.org/10.3390/brainsci11050654

Schieve, L. A., Clayton, H. B., Durkin, M. S., Wingate, M. S., & Drews-Botsch, C. (2015). Comparison of Perinatal Risk Factors Associated with Autism Spectrum Disorder (ASD), Intellectual Disability (ID), and Co-occurring ASD and ID. *Journal of Autism and Developmental Disorders*, *45*(8), 2361–2372. https://doi.org/10.1007/s10803-015-2402-0

Schoon, I., Parsons, S., Rush, R., & Law, J. (2010). Children's language ability and psychosocial development: A 29-year follow-up study. *Pediatrics*, *126*(1), 73–80. https://doi.org/10.1542/peds.2009-3282

Sheldrick, R. C., Merchant, S., & Perrin, E. C. (2011). Identification of developmental-behavioral problems in primary care: A systematic review. *Pediatrics*, *128*(2), 356–363. https://doi.org/10.1542/peds.2010-3261

Shephard, E., Zuccolo, P. F., Idrees, I., Godoy, P. B. G., Salomone, E., Ferrante, C., Sorgato, P.,

Catão, L. F. C. C., Goodwin, A., Bolton, P. F., Tye, C., Groom, M. J., & Polanczyk, G. V. (2022). Systematic Review and Meta-analysis: The Science of Early-Life Precursors and Interventions for Attention-Deficit/Hyperactivity Disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *61*(2), 187–226. https://doi.org/10.1016/j.jaac.2021.03.016

Sim, F., Thompson, L., Marryat, L., Law, J., & Wilson, P. (2019). Preschool developmental concerns and adjustment in the early school years: Evidence from a Scottish birth cohort. *Child: Care, Health and Development*, *45*(5), 719–736. https://doi.org/10.1111/cch.12695

Skeat, J., Wake, M., Ukoumunne, O. C., Eadie, P., Bretherton, L., & Reilly, S. (2014). Who gets help for pre-school communication problems? Data from a prospective community study. *Child: Care, Health and Development*, *40*(2), 215–222. https://doi.org/10.1111/cch.12032

Smolla, N., Béliveau, M.-J., Breault, C., Noël, R., Lévesque, A., Gagné, G., Berthiaume, C., & Martin, V. (2018). Enfants d'âge préscolaire évalués en psychiatrie: l'inquiétude parentale concernant le langage dépend-elle de la sévérité des atteintes expressives et réceptives? *Canadian Journal of Speech-Language Pathology and Audiology*, *42*(1), 21–40.

Smolla, N., Lévesque, A., Berthiaume, C., & Martin, V. (2015). *La pertinence de l'inquiétude parentale pour le développement langagier du jeune enfant référé en psychiatrie*. *36*, 235–263.

Stanton-Chapman, T. L., Chapman, D. A., Kaiser, A. P., & Hancock, T. B. (2004). Cumulative Risk and Low-Income Children's Language Development. *Topics in Early Childhood Special Education*, *24*(4), 227–237. https://doi.org/10.1177/02711214040240040401

Tran, A. T., del Rosario, M., Nosco, E., Li, Y., Senturk, D., Mcdonald, N. M., Wilson, R. B., Dapretto, M., & Jeste, S. S. (2021). Early concerns in parents of infants at risk for autism. *Developmental Medicine and Child Neurology*, *63*(12), 1410–1416. https://doi.org/10.1111/dmcn.14925

Trevethan, R. (2017). *Sensitivity, Specificity, and Predictive Values: Foundations, Pliabilities, and Pitfalls in Research and Practice*. *5*(November), 1–7. https://doi.org/10.3389/fpubh.2017.00307

Uljarević, M., Katsos, N., Hudry, K., & Gibson, J. L. (2016). Practitioner Review: Multilingualism and neurodevelopmental disorders – an overview of recent research and discussion of clinical implications. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *57*(11), 1205–1217. https://doi.org/10.1111/jcpp.12596

Valade, F., Béliveau, M.-J., Breault, C., Chabot, B., & Labelle, F. (2022). *Individual and cumulative risk factors in developmental language disorder : A case-control study*. *0*(0), 1–17. https://doi.org/10.1177/13591045221113389

Vasileva, M., Graf, R. K., Reinelt, T., Petermann, U., & Petermann, F. (2021). Research review: A meta-analysis of the international prevalence and comorbidity of mental disorders in children between 1 and 7 years. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *62*(4), 372–381. https://doi.org/10.1111/jcpp.13261

Wakschlag, L. S., Roberts, M. Y., Flynn, R. M., Smith, J. D., Krogh-Jespersen, S., Kaat, A. J., Gray, L., Walkup, J., Marino, B. S., Norton, E. S., & Davis, M. M. (2019). Future Directions for Early Childhood Prevention of Mental Disorders: A Road Map to Mental Health, Earlier. *Journal of Clinical Child and Adolescent Psychology*, *48*(3), 539–554.

https://doi.org/10.1080/15374416.2018.1561296

Wallisch, A., Little, L., Dean, E., & Dunn, W. (2020). Parent concerns: Differentiating developmental diagnoses in young children. *Research in Developmental Disabilities*, *103*(December 2019), 1–7. https://doi.org/10.1016/j.ridd.2020.103684

Warnick, E. M., Bracken, M. B., & Kasl, S. (2008). Screening efficiency of the child behavior checklist and strengths and difficulties questionnaire: A systematic review. *Child and Adolescent Mental Health*, *13*(3), 140–147. https://doi.org/10.1111/j.1475-3588.2007.00461.x

Weisz, J. R., Chorpita, B. F., Frye, A., Ng, M. Y., Lau, N., Bearman, S. K., Ugueto, A. M., Langer, D. A., & Hoagwood, K. E. (2011). Youth top problems: Using idiographic, consumer-guided assessment to identify treatment needs and to track change during psychotherapy. *Journal of Consulting and Clinical Psychology*, *79*(3), 369–380. https://doi.org/10.1037/a0023307

Weitzman, C. C., Edmonds, D., Davagnino, J., & Briggs-Gowan, M. (2011). The association between parent worry and young children's social-emotional functioning. *Journal of Developmental and Behavioral Pediatrics*, *32*(9), 660–667. https://doi.org/10.1097/DBP.0b013e31822bc76b

Wichstrøm, L., Berg-Nielsen, T. S., Angold, A., Egger, H. L., Solheim, E., & Sveen, T. H. (2012). Prevalence of psychiatric disorders in preschoolers. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *53*(6), 695–705. https://doi.org/10.1111/j.1469-7610.2011.02514.x

Wilson, B. N., Neil, K., Kamps, P. H., & Babcock, S. (2013). Awareness and knowledge of developmental co-ordination disorder among physicians, teachers and parents. *Child: Care, Health and Development*, *39*(2), 296–300. https://doi.org/10.1111/j.1365-2214.2012.01403.x

World Health Organization. (2013). Mental Health Action Plan 2013-2020. In *World Health Organization*. https://doi.org/10.1207/s15327752jpa8601_03

Youngstrom, E. A. (2013). Future Directions in Psychological Assessment: Combining Evidence-Based Medicine Innovations with Psychology's Historical Strengths to Enhance Utility. *Journal of Clinical Child and Adolescent Psychology*, *42*(1), 139–159. https://doi.org/10.1080/15374416.2012.736358

Zablotsky, B., Black, L. I., Maenner, M. J., Schieve, L. A., Danielson, M. L., Bitsko, R. H., Blumberg, S. J., Kogan, M. D., & Boyle, C. A. (2019). Prevalence and trends of developmental disabilities among children in the United States: 2009–2017. *Pediatrics*, *144*(4), 2009–2017. https://doi.org/10.1542/peds.2019-0811

Zablotsky, B., States, U., Colpe, L. J., States, U., Pringle, B. A., States, U., Kogan, M. D., Bureau, C. H., States, U., Rice, C., States, U., Blumberg, S. J., & States, U. (2018). *HHS Public Access*. *122*(1), 49–61. https://doi.org/10.1352/1944-7558-122.1.49.Age

Discussion

Résumé des objectifs et résultats

L'objectif général de la présente thèse était de développer les connaissances sur la surveillance développementale des troubles de santé mentale à la petite enfance. Elle visait à contribuer à l'identification d'éléments spécifiques pouvant optimiser la détection de troubles mentaux ainsi qu'à soutenir la démarche diagnostique chez les enfants d'âge préscolaire référés en pédopsychiatrie. Plus spécifiquement, elle avait comme objectif de mieux cibler les facteurs de risque et les inquiétudes rapportées par les parents qui distinguent le TDL des autres troubles mentaux.

Le premier article visait à étudier les facteurs de risques propres au TDL, en les comparant aux autres troubles mentaux. Les résultats obtenus ont permis d'identifier l'acquisition des premières phrases après 24 mois, l'immigration maternelle et les antécédents familiaux de retard langagier comme les prédicteurs les plus importants du TDL chez des enfants d'âge préscolaire référés en clinique psychiatrique. Les enfants consultants qui présentent ces caractéristiques sont donc plus susceptibles de recevoir un diagnostic de TDL, par rapport aux autres troubles mentaux. Nos résultats révèlent également que certains facteurs de risque du TDL bien documentés dans la littérature scientifique ne permettaient pas de discriminer les enfants diagnostiqués avec un TDL de ceux qui présentent d'autres troubles de santé mentale, ce qui témoigne de l'importance de comparer simultanément les facteurs de risque afin d'identifier ceux qui sont spécifiquement associés à un trouble et ceux qui sont associés à la psychopathologie en général.

De plus, les résultats de cet article ont permis de constater, pour la première fois, que les enfants atteints de TDL étaient exposés à un nombre significativement plus élevé de facteurs de

risque que ceux atteints d'autres troubles mentaux, et ce, même en contrôlant pour le nombre de diagnostics. En d'autres termes, l'identification de caractéristiques spécifiques apparaît nécessaire mais insuffisante pour cibler les enfants à risque de TDL dans un échantillon clinique ; l'exposition à des risques multiples doit également être prise en compte.

Le deuxième article visait à documenter la précision des inquiétudes parentales par ses niveaux de sensibilité et de spécificité ainsi que par sa valeur prédictive quant au diagnostic final des enfants consultants en pédopsychiatrie à la petite enfance. Les résultats obtenus ont démontré que les parents dont les enfants sont référés aux services de pédopsychiatrie manifestent de nombreuses inquiétudes et sont plus fréquemment préoccupés par le langage et le comportement de leur enfant. Une variabilité a été observée dans les taux de sensibilité et de spécificité des inquiétudes parentales, selon les diagnostics. Les troubles du langage ont été mieux détectés par les parents que les autres troubles, tout en étant moins spécifiques, car ils pouvaient être associés à d'autres diagnostics que le TDL. Les analyses de prédiction ont révélé que les préoccupations des parents concernant le langage, le comportement, l'attention, l'hyperactivité et les problèmes intériorisés sont significativement associés au diagnostic reçu, et ce, indépendamment de l'âge de l'enfant. Les inquiétudes parentales pour le langage représentent donc un indicateur généralement fiable et pertinent dans la détection du TDL dès l'âge préscolaire, contrairement aux inquiétudes relatives à la sphère motrice. En effet, la vaste majorité des parents n'avaient pas préalablement partagé de préoccupation par rapport à la motricité ou la coordination de leur enfant lorsqu'un diagnostic de TDC était émis. Les parents d'enfants diagnostiqués avec un TDC au sein de notre échantillon avaient plutôt émis des inquiétudes relatives au langage de leur enfant, ce qui suggère d'investiguer systématiquement le développement moteur lorsque des inquiétudes langagières sont rapportées par les parents.

Intégration des résultats et pistes de recherche futures

La psychopathologie à l'âge préscolaire est moins étudiée, en raison notamment de réserves à statuer sur des difficultés observées en jeune âge chez les enfants. En outre, les connaissances actuelles dans ce champ de recherche sont principalement basées sur des études populationnelles. Le manque d'études qui comparent des groupes cliniques entre eux peut entraîner des biais importants quant aux connaissances développées et leur application en pratique pour les populations cliniques. C'est particulièrement le cas pour le diagnostic du TDL à l'âge préscolaire; les professionnels de la santé sont appelés, notamment par les lignes directrices du DSM-5-TR, à faire preuve de prudence face à l'émission d'un diagnostic de TDL avant l'âge de 4 ans en raison du manque de soutien empirique concernant la stabilité des difficultés langagière à l'âge préscolaire (American Psychiatric Association, 2022). Des résultats récents apportent toutefois des nuances à cette conception ; les difficultés langagières se sont montrées stables et persistantes dans le temps chez des enfants consultants qui présentent des atteintes sévères avant l'âge de quatre ans (Breault et al., 2023). Considérant les conséquences majeures du TDL sur le développement et la persistance des atteintes importantes du langage identifiées à l'âge préscolaire au sein de populations cliniques, il apparait nécessaire de cibler rapidement les enfants à risque de développer un TDL parmi les jeunes référés aux services spécialisés afin de leur offrir l'intervention appropriée.

Les résultats des articles de la présente thèse soulignent l'importance de tenir compte systématiquement des facteurs de risque et des inquiétudes parentales dans la détection précoce du TDL à la petite enfance en contexte pédopsychiatrique. Dans l'optique de favoriser une démarche médicale plus intégrée (Youngstrom, 2013), ces éléments pourraient être combinés afin de développer des algorithmes pour améliorer la détection précoce du TDL lors des démarches

d’évaluation diagnostique. De tels modèles pourraient atteindre des niveaux élevés de sensibilité et de spécificité et optimiser le processus de détection et d'orientation, en s’assurant qu'aucun enfant n'est laissé pour compte. Ces résultats s’insèrent dans le courant d’études sur l’évaluation basée sur des données probantes (Evidence-based Assessment; Weisz et al., 2011), visant à développer une approche robuste au plan psychométrique et centrée sur les besoins des patients, en complément aux outils d’évaluation standardisés par l’optimisation des processus décisionnels de l’évaluation en s’appuyant sur les faits empiriques les plus à jour afin de favoriser un meilleur pronostic. Malgré les apports importants des pratiques basées sur les données probantes, un écart entre la recherche et la pratique demeure, et ce, particulièrement pour les services de la petite enfance (Movahedazarhouligh, 2022). Une étude issue de ce courant de recherche a démontré que les problèmes émotionnels et développementaux identifiés par les jeunes et leurs parents étaient cliniquement pertinents et correspondaient aux résultats de questionnaires standardisés au sein d’un échantillon communautaire d’enfants d’âge scolaire recevant des services en intervention psychologique (Weisz et al., 2011). Les résultats de notre deuxième article portant sur les inquiétudes parentales permettent l’élargissement de ces conclusions à une population clinique d’enfants d’âge préscolaire et contribue donc au développement de connaissances dans les pratiques basées sur les données probantes à la petite enfance.

Nos résultats améliorent la compréhension actuelle des composantes de la surveillance développementale, en les comparant entre les troubles. L’échantillon de recherche de notre thèse était constitué d’une cohorte entière d’enfants référés aux services de psychiatrie de la petite enfance entre 2006 et 2015. La grande taille de cet échantillon et l’ampleur des informations qui ont pu être documentées à leur sujet ont permis de considérer de nombreuses variables, comme les facteurs de risque et les inquiétudes parentales, parmi de nombreux troubles mentaux. En

effet, la présente thèse documente une variété de diagnostics présentés par les patients d'âge préscolaire en pédopsychiatrie, ce qui reflète mieux la complexité de cette population clinique. La comparaison de groupes cliniques est rare, bien qu'il s'agisse d'une méthode enrichissante pour le développement des connaissances sur les troubles mentaux à l'enfance. Cette perspective intégrative sur la détection des troubles mentaux est innovante et montre que certains marqueurs fiables permettent de faire la distinction entre les groupes cliniques, ce qui ne peut être vérifié lorsqu'aucun groupe de comparaison clinique n'est inclus. D'un point de vue de santé publique, de telles études sont importantes pour s'assurer de l'accord entre l'organisation des services de santé et les besoins des populations cliniques et pour cibler des facteurs de risque pertinents.

Les résultats de notre deuxième article montrent que les inquiétudes parentales pour le langage sont les plus fiables, tout en étant moins spécifiques, car elles sont associées à d'autres diagnostics que le TDL, comme le trouble du spectre de l'autisme, la déficience intellectuelle, qui présentent une composante langagière inhérente, mais également au trouble développemental de la coordination (TDC). Ces résultats peuvent s'expliquer par le caractère transdiagnostique des difficultés langagières. Par ailleurs, la cooccurrence la plus fréquemment observée au sein de notre échantillon concernait le TDL et le TDC, deux troubles neurodéveloppementaux connus pour leur haut taux de concomitance (Chow & Wehby, 2018; Flapper & Schoemaker, 2013), ce qui soulève des questionnements quant à la classification catégorielle des diagnostiques neurodéveloppementaux à la petite enfance. En effet, les systèmes de classification actuels, tel que le DSM-5-TR, ne peuvent pas facilement s'adapter au chevauchement entre certains troubles qui sont considérés comme des entités distinctes (Coghill et Sonuga-Barke, 2012). L'adhérence à un système taxonomique a conduit de nombreuses études au recrutement d'échantillons sélectifs, basés sur la présence ou l'absence d'un diagnostic particulier en éliminant les troubles

concomitants connus des échantillons (Astle et al., 2022). Considérant la réalité selon laquelle la co-occurrence des troubles mentaux est fréquente à l'enfance (B. H. Hansen et al., 2018; Vasileva et al., 2021), la représentativité des résultats issus de ces recherches est remise en cause par les approches transdiagnostiques. Davantage d'études comparant les troubles entre eux sont donc nécessaires pour développer une meilleure compréhension des troubles mentaux, de leur co-occurrence et de leur détection.

L'écart important entre les inquiétudes concernant la sphère motrice et le diagnostic de TDC est un résultat inattendu et représente un enjeu majeur auquel s'attarder. Ces résultats peuvent s'expliquer par le fait que les parents et praticiens de la santé sont peu sensibilisés aux indices d'un développement moteur à risque en bas âge (Blank et al., 2019; Wilson et al., 2013) ou que les parents tendent à chercher des services pour des problèmes qui perturbent fonctionnement familial (Ellingson et al., 2004). Considérant que les difficultés motrices en bas âge sont associées à des problèmes psychosociaux et émotionnels (Katagiri et al., 2021), il est possible que les parents ne saisissent pas l'ampleur des impacts du TDC sur le fonctionnement de l'enfant et qu'ils attribuent ces manifestations à d'autres explications, comme des comportements opposants ou de l'inattention. Il nous apparait primordial de développer des programmes de sensibilisation aux indices et aux répercussions d'un TDC à la petite enfance pour la population et pour les professionnels du réseau de la santé afin de permettre une détection plus efficace de ce trouble.

Les résultats des études exploratoires de la présente thèse gagneraient à être reproduits dans d'autres contextes cliniques pour vérifier la généralisation des résultats à d'autres échantillons composés d'enfants atteints de difficultés variées afin de documenter l'utilité des facteurs de risque et des inquiétudes parentales comme outils de surveillance psychiatrique.

Limites de la thèse

Tel que mentionné dans la section *Discussion* de chacun des articles, les études présentent des limites méthodologiques qui méritent d'être énoncées. Plusieurs résultent de la méthodologie employée d'extraction des données à partir des informations des dossiers cliniques des patients. Cette méthode a permis d'accéder à une cohorte entière d'enfants d'âge préscolaire qui ont consulté en psychiatrie sans attrition, mais a entraîné un taux élevé de valeurs manquantes. Cette limite a été adressée en s'assurant de la représentativité des résultats en comparant les caractéristiques sociodémographiques des participants avec et sans valeurs manquantes. Le devis de recherche rétrospectif a également limité la possibilité de documenter certaines variables d'intérêt, notamment le statut socioéconomique de la famille. Des variables de contrôle ou des mesures proxy ont été employées pour remédier à ce problème. L'hétérogénéité des difficultés expérimentés par les participants et la forte concomitance entre certains troubles mentaux observées dans notre échantillon ont potentiellement réduit la force de certaines prédictions et la capacité à départager les facteurs de risque et les inquiétudes parentales propres à des troubles spécifiques. De plus, l'absence de groupe contrôle sans diagnostic a restreint la portée des conclusions de nos études. Aussi, certains facteurs de risque, comme l'âge de l'acquisition des jalons développementaux, ont été documentés au moment de l'évaluation, selon le rappel du parent. Une perte de précision peut donc être engendrée par la collecte d'information rétrospective. Les résultats obtenus dans la présente thèse gagneraient à être reproduits par des études à devis prospectif longitudinal composées de groupes cliniques et d'un groupe contrôle.

Forces de la thèse

Bien que le devis rétrospectif de la présente thèse ait posé certaines limites, plusieurs forces méritent d'être énoncées. Tout d'abord, l'accès à une cohorte entière d'enfants consultants

en clinique psychiatrique de la petite enfance sans attrition ni biais de sélection représente une force notable en ce qui a trait à la validité écologique et la représentativité des résultats obtenus. La richesse de notre grande taille d'échantillon et de la base de données développée à partir des informations des participants a permis la comparaison de groupes cliniques basés sur des évaluations multidisciplinaires exhaustives ayant mené au diagnostic des enfants, par opposition à une sélection des participant sur la base de réponses à des questionnaires. Les résultats issus de la présente thèse contribuent aux connaissances de différentes approches scientifiques et cliniques. Ils offrent un apport à l'approche de la pratique basée sur des données probantes (Evidence-based practice; Weisz et al., 2011) et à l'approche centrée sur la famille (Franck & O'Brien, 2019) , tout en développant les connaissances dans des champs de recherche négligés pour lesquels les instances de santé publique et la population sont peu sensibilisés, comme le TDL qui est grandement moins étudié que d'autres troubles neurodéveloppementaux (Bishop et al., 2012; Kim et al., 2022) et la psychopathologie à la petite enfance (Vasileva et al., 2021).

Implications cliniques

À la lumière de nos résultats, nous concluons que l'utilisation des facteurs de risque et des inquiétudes parentales devrait être optimisée dans les services à la petite enfance pour orienter plus rapidement les enfants à risque vers les services d'intervention précoce, d'autant plus que le processus d'évaluation des enfants de notre échantillon était d'une durée moyenne de 14 mois à compter de la complétion du questionnaire de pré-évaluation dans lequel était notées ces informations. Cela implique que plusieurs enfants se sont retrouvés sans services à un moment charnière de leur développement, même s'ils avaient été référés à des services spécialisés et que des indicateurs fiables de détection précoce du TDL étaient disponibles.

Le très faible pourcentage d'enfants d'âge préscolaire atteints de troubles mentaux qui accèdent à des services de santé mentale spécialisés est un problème majeur de santé publique, compte tenu de la prévalence élevée et des répercussions négatives importantes des troubles mentaux chez les jeunes enfants et toute leur famille. Les résultats issus de la présente thèse sont en continuité avec des enjeux majeurs d'actualité, soulevés par un rapport récent de l'Institut national d'excellence en santé et en services sociaux (INESSS, 2021) concernant l'évaluation précoce des troubles neurodéveloppementaux. En effet, ce rapport fait état de plusieurs limites persistantes liées aux trajectoires de services menant à l'évaluation diagnostique, notamment concernant l'accessibilité, l'efficience, la coordination et la continuité des services, malgré les initiatives gouvernementales visant à améliorer l'offre de services aux enfants qui présentent des difficultés ou des retards, comme le programme *Agir tôt*. L'importance d'implanter une approche patient-partenaire en prenant en compte les besoins des familles et en les impliquant tout au long du processus d'évaluation ainsi que la diminution des délais d'attente ont été identifiés parmi les enjeux principaux à améliorer dans la trajectoire de services des enfants présentant des difficultés en jeune âge. Or, deux ans plus tard, une enquête sur le programme *Agir tôt* publiée dans le journal Le Devoir dénonce les longs délais d'attente ainsi que la complexité des démarches administratives pour les familles et le manque de continuité dans les services une fois le dépistage effectué (Cousineau, 2023). Les résultats de la présente thèse fournissent des pistes de pratiques pertinentes pour remédier à ces lacunes, qui seront discutées dans cette section.

Concernant le TDL, il est démontré que l'intervention précoce constitue un des leviers les plus importants pour que des changements durables se produisent chez les enfants qui présentent des difficultés de communication (Dockrell et al., 2012). Soutenir les jeunes enfants présentant un risque de TDL et leur famille dans l'objectif de limiter les impacts des difficultés langagière

sur le développement cognitif et socioaffectif (Conti-Ramsden et al., 2018; Elbro et al., 2011; Parsons et al., 2011) nous apparait primordial. En ce sens, les conclusions d'un rapport récent de l'Institut national d'excellence en santé et en services sociaux (INESSS, 2017) sur les troubles du langage rappellent que bien que l'établissement d'un diagnostic demeure important, il ne doit pas ralentir la mise en place des services nécessaires pour ces enfants. Plusieurs éléments additionnels appuient d'ailleurs la pertinence de l'intervention précoce et ce, tant pour le pronostic que pour la démarche diagnostique du TDL. Les services d'intervention précoce permettent notamment aux professionnels de la santé d'avoir en main davantage d'informations sur l'enfant, ce qui facilite par la suite l'évaluation diagnostique (Institut national d'excellence en santé et en services sociaux (INESSS, 2021). Ces pratiques rejoignent également une approche « dialectique évaluation-intervention » (Weisz et al., 2004; Kao et al., 2022) au sein de laquelle l'évaluation, basée sur les besoins des familles, est utilisée pour planifier et ajuster le traitement en réponse aux changements dans le fonctionnement du patient. Les inquiétudes parentales pourraient d'ailleurs être répertoriées de manière dynamique au cours de l'évaluation et de l'intervention afin de s'assurer de l'arrimage entre les besoins des patients et le plan de traitement proposé, et par ce biais, favoriser un meilleur pronostic pour les jeunes enfants.

Une meilleure connaissance et une utilisation plus efficiente des inquiétudes parentales ainsi que des facteurs de risque spécifiques au TDL lors des premiers stades du développement de l'enfant pourraient être déterminantes pour le pronostic, en se concentrant plus rapidement sur les interventions nécessaires tout en allégeant le fardeau des évaluations approfondies. Une approche soutenant l'intégration systématique des facteurs de risque et des inquiétudes parentales dans l'évaluation clinique pourrait permettre de faire de meilleurs partenaires des parents dont la connaissance de leur enfant est particulièrement précieuse. Cette pratique n'impliquerait pas

d'ajouter aux tâches des professionnels de la santé qui sont responsables de faire la surveillance développementale par l'administration et la cotation de questionnaires. Au contraire, il s'agit de questions de routine qui peuvent être facilement posées et intégrées à des moments-clés du développement, puis dans les suivis médicaux. Par exemple, certaines informations concernant les facteurs de risque, comme l'immigration maternelle et l'antécédent familial de retard de langage, pourraient être colligées par l'infirmière post-accouchement, puis l'âge des premières phrases et les inquiétudes parentales dans le suivi annuel de l'enfant avec son pédiatre ou médecin de famille. De telles procédures s'insèrent dans une approche patient-partenaire tout en adressant un problème actuellement soulevé par rapport aux initiatives gouvernementales mentionnées plus haut quant à l'évaluation précoce, qui impliquent un niveau élevé de démarches administratives nuisant à l'accès aux soins pour les familles (INESSS, 2021).

En termes de coût-efficacité, le modèle optimisé de surveillance développementale proposé dans la présente thèse peut inspirer des procédures de collectes de données harmonisées pour tous les enfants. Par ailleurs, l'avènement de l'intelligence artificielle pourrait donner place au développement d'un système de collecte systématique de l'information à chaque visite pédiatrique qui établirait automatiquement un niveau de risque selon les antécédents rapportés et soutiendrait une orientation plus efficace des enfants à risque vers les services appropriés.

Conclusion

Dans l'ensemble, cette thèse a permis de contribuer à l'avancement des connaissances sur la détection du TDL à la petite enfance par l'optimisation de l'utilisation des facteurs de risque et des inquiétudes parentales, dans un contexte clinique. Elle montre l'importance d'utiliser une approche intégrative, basée sur les données probantes et ajustée aux besoins des familles dans l'évaluation et la planification des services des enfants d'âge préscolaire consultants en

pédopsychiatrie. Sur le plan théorique, cette thèse a été novatrice en comparant les marqueurs entre différents diagnostics, ce qui a permis de départager leur contribution dans l'émergence du TDL et de préciser les cibles d'identification des enfants à risque de développer cette pathologie. La présente thèse encourage le développement d'efforts simples, mais bien orientés dès les premières années de vie qui ont le potentiel d'avoir un impact déterminant dans le parcours des enfants atteints de TDL. Il importe en effet d'*agir tôt*, mais également d'agir efficacement et de concert avec les besoins des familles pour optimiser la trajectoire de soins et le pronostic des petits patients, tout en allégeant les procédures bureaucratiques pour les familles et le personnel de la santé.

Références citées dans l'introduction et la discussion

Achenbach, T. M., & Rescorla, M. A. (2000). *Manuel of the Child Behavior Checklist 1.5/5 years*. University of Vermont, Research Center for Children, Youth, and Families.

Alexander, K. E., Brijnath, B., & Mazza, D. (2013). "Can they really identify mental health problems at the age of three?" Parent and practitioner views about screening young children's social and emotional development. *Australian and New Zealand Journal of Psychiatry*, *47*(6), 538–545. https://doi.org/10.1177/0004867413476756

AlHammadi, F. S. (2017). Prediction of child language development: A review of literature in early childhood communication disorders. *Lingua*, *199*, 27–35. https://doi.org/10.1016/j.lingua.2017.07.007

American Psychiatric Association. (2022). *Manuel diagnotic et statistique des troubles mentaux* (5e édition). https://doi.org/https://doi.org/10.1176/appi.books.9780890425596

Andersson, K., Hansson, K., Rosqvist, I., Åhlander, V. L., Sahlén, B., & Sandgren, O. (2019). The contribution of bilingualism, parental education, and school characteristics to performance on the clinical evaluation of language fundamentals: Fourth edition, Swedish. *Frontiers in Psychology*, *10*, 1–7. https://doi.org/10.3389/fpsyg.2019.01586

Astle, D. E., Holmes, J., Kievit, R., & Gathercole, S. E. (2022). Annual Research Review: The transdiagnostic revolution in neurodevelopmental disorders. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *63*(4), 397–417. https://doi.org/10.1111/jcpp.13481

Bellman, M., Byrne, O., & Sege, R. (2013). Developmental assessment of children. *BMJ (Online)*, *345*(7891), 1–9. https://doi.org/10.1136/bmj.e8687

Benner, G. J., Nelson, J. R., & Epstein, M. H. (2002). Language skills of children with EBD: A literature review. *Journal of Emotional and Behavioral Disorders*, *10*(1), 43–59. https://doi.org/10.1177/106342660201000105

Bishop, D., Clark, B., Conti-Ramsden, G., Norbury, C. F., & Snowling, M. J. (2012). RALLI: An internet campaign for raising awareness of language learning impairments. *Child Language Teaching and Therapy*, *28*(3), 259–262. https://doi.org/10.1177/0265659012459467

Bishop, D., Snowling, M. J., Thompson, P. A., & Greenhalgh, T. (2017). Phase 2 of CATALISE: A multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. https://doi.org/10.1111/jcpp.12721

Bishop, D., Snowling, M. J., Thompson, P. A., Greenhalgh, T., Adams, C., Archibald, L., Baird, G., Bauer, A., Bellair, J., Boyle, C., Brownlie, E., Carter, G., Clark, B., Clegg, J., Cohen, N., Conti-Ramsden, G., Dockrell, J., Dunn, J., Ebbels, S., … Whitehouse, A. (2016). CATALISE: A multinational and multidisciplinary Delphi consensus study. Identifying language impairments in children. *Plos One*, *11*(7), 1–26. https://doi.org/10.1371/journal.pone.0158753

Bishop, D., Snowling, M., Thompson, P., Greenhalgh, T., Adams, C., Archibald, L., Baird, G., Bauer, A., Bellair, J., Boyle, C., Brownlie, E., Carter, G., Clark, B., Clegg, J., Cohen, N., Conti-Ramsden, G., Dockrell, J., Dunn, J., Ebbels, S., … House, A. (2017). Phase 2 of CATALISE: a multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *58*(10), 1068–1080. https://doi.org/10.1111/jcpp.12721

Blank, R., Barnett, A. L., Cairney, J., Green, D., Kirby, A., Polatajko, H., Rosenblum, S., Smits-Engelsman, B., Sugden, D., Wilson, P., & Vinçon, S. (2019). International clinical practice recommendations on the definition, diagnosis, assessment, intervention, and psychosocial aspects of developmental coordination disorder. *Developmental Medicine and Child Neurology*, *61*(3), 242–285. https://doi.org/10.1111/dmcn.14132

Breault, C., Béliveau, M. J., Labelle, F., Valade, F., & Trudeau, N. (2023). Stability of language difficulties among a clinical sample of preschoolers. *International Journal of Language and Communication Disorders*, *58*(1), 138–153. https://doi.org/10.1111/1460-6984.12776

Briggs-Gowan, M. J., Carter, A. S., Bosson-Heenan, J., Guyer, A. E., & Horwitz, S. M. (2006). Are Infant-Toddler Social-Emotional and Behavioral Problems Transient ? *Journal of the American Academy of Child & Adolescent Psychiatry*, *45*(7), 849–858. https://doi.org/10.1097/01.chi.0000220849.48650.59

Briggs-Gowan, M. J., Carter, A. S., Skuban, E. M., & Horwitz, S. M. C. (2001). Prevalence of social-emotional and behavioral problems in a community sample of 1- and 2-year-old children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *40*(7), 811–819. https://doi.org/10.1097/00004583-200107000-00016

Brignell, A., Williams, K., Jachno, K., Prior, M., Reilly, S., & Morgan, A. T. (2018). Patterns and Predictors of Language Development from 4 to 7 Years in Verbal Children With and Without Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, *48*(10), 3282–3295. https://doi.org/10.1007/s10803-018-3565-2

Bufferd, S. J., Dougherty, L. R., Carlson, G. A., Rose, S., & Klein, D. N. (2012). Psychiatric disorders in preschoolers: Continuity from ages 3 to 6. *American Journal of Psychiatry*,

169(11), 1157–1164. https://doi.org/10.1176/appi.ajp.2012.12020268

Campbell, T. F., Dollaghan, C. A., Rackette, H. E., Paradise, J. L., Feldman, H. M., Shriberg, L. D., Sabo, D. L., & Kurs-Lasky, M. (2003). Risk Factors for Speech Delay of Unknown Origin in 3-Year-Old Children. *Child Development*, *74*(2), 346–357. https://doi.org/10.1111/1467-8624.7402002

Capone Singleton, N. (2018). Late Talkers: Why the Wait-and-See Approach Is Outdated. *Pediatric Clinics of North America*, *65*(1), 13–29. https://doi.org/10.1016/j.pcl.2017.08.018

Caron, C., & Rutter, M. (1991). Comorbidity in Child Psychopathology: Concepts, Issues and Research Strategies. *Journal of Child Psychology and Psychiatry*, *32*(7), 1063–1080. https://doi.org/10.1111/j.1469-7610.1991.tb00350.x

Charach, A., Mohammadzadeh, F., Belanger, S. A., Easson, A., Lipman, E. L., McLennan, J. D., Parkin, P., & Szatmari, P. (2020). Identification of preschool children with mental health problems in primary care: Systematic review and identification of preschool children with mental health problems in primary care: Systematic review and meta-analysis. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *29*(2), 76–105.

Chen, H. J., Hsin-Ju Ko, M., Li, S. T., Chiu, N. C., & Hung, K. L. (2020). Prevalence of preschool children developmental disabilities in northeastern Taiwan - Screening with Taipei City Developmental Screening Checklist for Preschoolers, 2nd Version. *Journal of the Formosan Medical Association*, *119*(7), 1174–1179. https://doi.org/10.1016/j.jfma.2020.02.001

Chow, J. C., & Wehby, J. H. (2018). Associations Between Language and Problem Behavior: a

Systematic Review and Correlational Meta-analysis. *Educational Psychology Review*, *30*(1), 61–82. https://doi.org/10.1007/s10648-016-9385-z

Chung, C. Y., Liu, W. Y., Chang, C. J., Chen, C. L., Tang, S. F. T., & Wong, A. M. K. (2011). The relationship between parental concerns and final diagnosis in children with developmental delay. *Journal of Child Neurology*, *26*(4), 413–419. https://doi.org/10.1177/0883073810381922

Collisson, B. A., Graham, S. A., Preston, J. L., Rose, M. S., McDonald, S., & Tough, S. (2016). Risk and protective factors for late talking: An epidemiologic investigation. *Journal of Pediatrics*, *172*, 168-174.e1. https://doi.org/10.1016/j.jpeds.2016.02.020

Conti-Ramsden, G., & Durkin, K. (2012). Language development and assessment in the preschool period. *Neuropsychology Review*, *22*(4), 384–401. https://doi.org/10.1007/s11065-012-9208-z

Conti-Ramsden, G., & Durkin, K. (2016). What Factors Influence Language Impairment? Considering Resilience as well as Risk. *Folia Phoniatrica et Logopaedica*, *67*(6), 293–299. https://doi.org/10.1159/000444750

Conti-Ramsden, G., & Durkin, K. (2017). Developmental Language Disorder. In D. Skuse, H. Bruce, & L. Dowdney (Eds.), *Child psychology and psychiatry: Frameworks for clinical training and practice* (pp. 307–313). Wiley Blackwell.

Conti-Ramsden, G., Durkin, K., Toseeb, U., Botting, N., & Pickles, A. (2018). Education and employment outcomes of young adults with a history of developmental language disorder. *International Journal of Language and Communication Disorders*, *53*(2), 237–255.

https://doi.org/10.1111/1460-6984.12338

Conti-Ramsden, G., Mok, P. L. H., Pickles, A., & Durkin, K. (2013). Adolescents with a history of specific language impairment (SLI): Strengths and difficulties in social, emotional and behavioral functioning. *Research in Developmental Disabilities*, *34*(11), 4161–4169. https://doi.org/10.1016/j.ridd.2013.08.043

Cree, R. A., Bitsko, R. H., Robinson, L. R., Holbrook, J. R., Danielson, M. L., Smith, C., Kaminski, J. W., Kenney, M. K., & Peacock, G. (2018). Health Care, Family, and Community Factors Associated with Mental, Behavioral, and Developmental Disorders and Poverty Among Children Aged 2–8 Years — United States, 2016. *MMWR. Morbidity and Mortality Weekly Report*, *67*(50), 1377–1383. https://doi.org/10.15585/mmwr.mm6750a1

Deakin-Bell, N., Walker, K., & Badawi, N. (2013). The accuracy of parental concern expressed in the Ages and Stages Questionnaire to predict developmental delay. *Journal of Paediatrics and Child Health*, *49*(2), 133–136. https://doi.org/10.1111/jpc.12084

Diepeveen, F. B., van Dommelen, P., Oudesluys-Murphy, A. M., & Verkerk, P. H. (2017). Specific language impairment is associated with maternal and family factors. *Child: Care, Health and Development*, *43*(3), 401–405. https://doi.org/10.1111/cch.12451

Dockrell, J., Ricketts, J., & Lindsay, G. (2012). Understanding speech, language and communication needs: Profiles of need and provision. In *Department for Education (DfE)* (Vol. 1, Issue November). https://dera.ioe.ac.uk/id/eprint/16322/1/DFE-RR247-BCRP4.pdf

Dougherty, L. R., Leppert, K. A., Merwin, S. M., Smith, V. C., Bufferd, S. J., & Kushner, M. R. (2015). Advances and directions in preschool mental health research. *Child Development*

Perspectives, *9*(1), 14–19. https://doi.org/10.1111/cdep.12099

Elbro, C., Dalby, M., & Maarbjerg, S. (2011). Language-learning impairments: A 30-year follow-up of language-impaired children with and without psychiatric, neurological and cognitive difficulties. *International Journal of Language and Communication Disorders*, *46*(4), 437–448. https://doi.org/10.1111/j.1460-6984.2011.00004.x

Ellingson, K. D., Briggs-Gowan, M. J., Carter, A. S., & Horwitz, S. M. (2004). Parent identification of early emerging child behavior problems: Predictors of sharing parental concern with health providers. *Archives of Pediatrics and Adolescent Medicine*, *158*(8), 766–772. https://doi.org/10.1001/archpedi.158.8.766

Farnesi, B. C., Newton, A. S., Holt, N. L., Sharma, A. M., & Ball, G. D. C. (2012). Exploring collaboration between clinicians and parents to optimize pediatric weight management. *Patient Education and Counseling*, *87*(1), 10–17. https://doi.org/10.1016/j.pec.2011.08.011

Flapper, B. C. T., & Schoemaker, M. M. (2013). Developmental Coordination Disorder in children with specific language impairment: Co-morbidity and impact on quality of life. *Research in Developmental Disabilities*, *34*(2), 756–763. https://doi.org/10.1016/j.ridd.2012.10.014

Ford, T., Sayal, K., Meltzer, H., Goodman, R., Ford, T., & Goodman, R. (2005). *Parental concerns about their child ' s emotions and behaviour and referral to specialist services : general population survey*. 1435–1436. https://doi.org/10.1136/bmj.38643.368692.681

Franck, L. S., & O'Brien, K. (2019). The evolution of family-centered care: From supporting parent-delivered interventions to a model of family integrated care. *Birth Defects Research*,

111(15), 1044–1059. https://doi.org/10.1002/bdr2.1521

Glascoe, F. P. (2003). *Parents' Evaluation of Developmental Status: How Well Do Parents' Concerns Identify Children With Behavioral and Emotional Problems? Frances*. *March*, 133–138.

Gleason, M. M., Zeanah, C. H., & Dickstein, S. (2010). Recognizing young children in need of mental health assessment: Development and preliminary validity of the early childhood screening assessment. *Infant Mental Health Journal*, *31*(3), 335–357. https://doi.org/10.1002/imhj.20259

Godoy, L., Carter, A. S., Silver, R. B., Dickstein, S., & Seifer, R. (2014). Infants and toddlers left behind: Mental health screening and consultation in primary care. *Journal of Developmental and Behavioral Pediatrics*, *35*(5), 334–343. https://doi.org/10.1097/DBP.0000000000000060

Gouvernement du Québec. (2022). *Plan d'action interministériel en santé mentale 2022-2026*. https://publications.msss.gouv.qc.ca/msss/fichiers/2021/21-914-14W.pdf

Halperin, J. M., & Marks, D. J. (2019). Practitioner Review: Assessment and treatment of preschool children with attention-deficit/hyperactivity disorder. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *60*(9), 930–943. https://doi.org/10.1111/jcpp.13014

Hammer, C. S., Morgan, P., Farkas, G., Hillemeier, M., Bitetti, D., & Maczuga, S. (2017). Late talkers: A population-based study of risk factors and school readiness consequences. *Journal of Speech, Language, and Hearing Research*, *60*(3), 607–626. https://doi.org/10.1044/2016_JSLHR-L-15-0417

Hansen, A., Telléus, G. K., Mohr-Jensen, C., & Lauritsen, M. B. (2021). Parent-perceived barriers to accessing services for their child's mental health problems. *Child and Adolescent Psychiatry and Mental Health*, *15*(1), 1–11. https://doi.org/10.1186/s13034-021-00357-7

Hansen, B. H., Oerbeck, B., Skirbekk, B., Petrovski, B. É., & Kristensen, H. (2018). Neurodevelopmental disorders: prevalence and comorbidity in children referred to mental health services. *Nordic Journal of Psychiatry*, *72*(4), 285–291. https://doi.org/10.1080/08039488.2018.1444087

Haque, M. M., Rabbani, M., Dipal, D. Das, Zarif, M. I. I., Iqbal, A., Schwichtenberg, A., Bansal, N., Soron, T. R., Ahmed, S. I., & Ahamed, S. I. (2021). Informing developmental milestone achievement for children with autism: Machine learning approach. *JMIR Medical Informatics*, *9*(6), 1–21. https://doi.org/10.2196/29242

Hollo, A., Wehby, J. H., & Oliver, R. M. (2014). Unidentified language deficits in children with emotional and behavioral disorders: A meta-analysis. *Exceptional Children*, *80*(2), 169–186. https://doi.org/10.1177/001440291408000203

Horwitz, S. M., Gary, L. C., Briggs-Gowan, M. J., & Carter, A. S. (2003). Do Needs Drive Services Use in Young Children? *Pediatrics*, *112*(6 I), 1373–1378. https://doi.org/10.1542/peds.112.6.1373

Horwitz, S. M., Irwin, J. R., Briggs-Gowan, M. J., Bosson Heenan, J. M., Mendoza, J., & Carter, A. S. (2003). Language Delay in a Community Cohort of Young Children. *Journal of the American Academy of Child & Adolescent Psychiatry*, *42*(8), 932–940. https://doi.org/10.1097/01.CHI.0000046889.27264.5E

Institut national d'excellence en santé et en services sociaux (INESSS). (2021). *Trajectoires de services menant à l'évaluation diagnostique des troubles neurodéveloppementaux chez les enfants de la naissance à sept ans*.

Katagiri, M., Ito, H., Murayama, Y., Hamada, M., Nakajima, S., Takayanagi, N., Uemiya, A., Myogan, M., Nakai, A., & Tsujii, M. (2021). Fine and gross motor skills predict later psychosocial maladaptation and academic achievement. *Brain and Development*, *43*(5), 605–615. https://doi.org/10.1016/j.braindev.2021.01.003

Kim, J. H., Davies, B., & Xu Rattanasone, N. (2022). Have You Heard of Developmental Language Disorder? An Online Survey. *Communication Disorders Quarterly*, *44*(4), 228–238. https://doi.org/10.1177/15257401221115822

King-Dowling, S., Rodriguez, M. C., Missiuna, C., & Cairney, J. (2016). Validity of the Ages and Stages Questionnaire to detect risk of Developmental Coordination Disorder in preschoolers. *Child: Care, Health and Development*, *42*(2), 188–194. https://doi.org/10.1111/cch.12314

Korpilahti, P., Kaljonen, A., & Jansson-Verkasalo, E. (2016). Identification of biological and environmental risk factors for language delay: The Let's Talk STEPS study. *Infant Behavior and Development*, *42*, 27–35. https://doi.org/10.1016/j.infbeh.2015.08.008

Le, H. A. N. D., Gold, L., Mensah, F., Eadie, P., Bavin, E. L., Bretherton, L., & Reilly, S. (2017). Service utilisation and costs of language impairment in children: The early language in Victoria Australian population-based study. *International Journal of Speech-Language Pathology*, *19*(4), 360–369. https://doi.org/10.1080/17549507.2016.1209559

Lipkin, P. H., Macias, M. M., & AAP COUNCIL ON CHILDREN WITH DISABILITIES, S. O. D. A. B. P. (2020). Promoting optimal development: Identifying Infants and Young Children With Developmental Disorders Through Developmental Surveillance and Screening. *Pediatrics*, *145*(1). https://doi.org/10.1542/PEDS.2019-3449

Locatelli, C., Onnivello, S., Antonaros, F., Feliciello, A., Filoni, S., Rossi, S., Pulina, F., Marcolin, C., Vianello, R., Toffalini, E., Ramacieri, G., Martelli, A., Procaccini, G., Sperti, G., Caracausi, M., Pelleri, M. C., Vitale, L., Pirazzoli, G. L., Strippoli, P., … Lanfranchi, S. (2021). Is the age of developmental milestones a predictor for future development in down syndrome? *Brain Sciences*, *11*(5). https://doi.org/10.3390/brainsci11050655

Loughan, A. R., & Perna, R. (2013). Early Developmental Delays: A Cross Validation Study. *Journal of Psychological Abnormalities in Children*, *01*(02), 1–5. https://doi.org/10.4172/2329-9525.1000105

Mash, E. J., & Hayden, E. P. (2014). Child Psychopathology A Developmental – Systems Perspective. In *Child Psychopathology* (pp. 3–72).

McEwen, B. S., & Stellar, E. (1993). Stress and the Individual: Mechanisms Leading to Disease. *Archives of Internal Medicine*, *153*(18), 2093–2101. https://doi.org/10.1001/archinte.1993.00410180039004

McKean, C., Mensah, F. K., Eadie, P., Bavin, E. L., Bretherton, L., Cini, E., & Reilly, S. (2015). Levers for language growth: Characteristics and predictors of language trajectories between 4 and 7 years. *PLoS ONE*, *10*(8), 1–21. https://doi.org/10.1371/journal.pone.0134251

Movahedazarhouligh, S. (2022). Evidence-Based, Empirically Supported, or Scientifically

Unsupported? An Overview of the Research to Practice Gap in Early Childhood Special Education. *Journal of Educational Studies and Multidisciplinary Approaches*, *2*(1), 37–51.

Muluk, N. B., Bayoğlu, B., & Anlar, B. (2014). Language development and affecting factors in 3- to 6-year-old children. *European Archives of Oto-Rhino-Laryngology*, *271*(5), 871–878. https://doi.org/10.1007/s00405-013-2567-0

Norbury, C. F., Gooch, D., Wray, C., Baird, G., Charman, T., Simonoff, E., Vamvakas, G., & Pickles, A. (2016). The impact of nonverbal ability on prevalence and clinical presentation of language disorder: evidence from a population study. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *57*(11), 1247–1257. https://doi.org/10.1111/jcpp.12573

Oh, E., Mathers, M., Hiscock, H., Wake, M., Oh, E., Mathers, M., Hiscock, H., Wake, M., Bayer, J., Oh, E., Mathers, M., Hiscock, H., Wake, M., & Bayer, J. (2015). Professional help seeking for young children with mental health problems. *Australian Journal of Psychology, 3*(67), 187–195. https://doi.org/10.1111/ajpy.12072

Parsons, S., Schoon, I., Rush, R., & Law, J. (2011). Long-term Outcomes for Children with Early Language Problems : Beating the Odds. *Children & Society*, *25*, 202–214. https://doi.org/10.1111/j.1099-0860.2009.00274.x

Peverill, M., Dirks, M. A., Narvaja, T., Herts, K. L., Comer, J. S., & McLaughlin, K. A. (2021). Socioeconomic status and child psychopathology in the United States: A meta-analysis of population-based studies. *Clinical Psychology Review*, *83*(October 2020). https://doi.org/10.1016/j.cpr.2020.101933

Putnick, D. L., Bornstein, M. H., Eryigit-Madzwamuse, S., & Wolke, D. (2017a). Long-Term

Stability of Language Performance in Very Preterm, Moderate-Late Preterm, and Term Children. *Journal of Pediatrics*, *181*, 74-79.e3. https://doi.org/10.1016/j.jpeds.2016.09.006

Putnick, D. L., Bornstein, M. H., Eryigit-Madzwamuse, S., & Wolke, D. (2017b). Long-Term Stability of Language Performance in Very Preterm, Moderate-Late Preterm, and Term Children Diane. *Physiology & Behavior*, *176*(12), 139–148. https://doi.org/10.1016/j.jpeds.2016.09.006.Long-Term

Radez, J., Reardon, T., Creswell, C., Lawrence, P. J., Evdoka-Burton, G., & Waite, P. (2021). Why do children and adolescents (not) seek and access professional help for their mental health problems? A systematic review of quantitative and qualitative studies. *European Child and Adolescent Psychiatry*, *30*(2), 183–211. https://doi.org/10.1007/s00787-019-01469-4

Reilly, S., Wake, M., Ukoumunne, O. C., Bavin, E., Prior, M., Cini, E., Conway, L., Eadie, P., & Bretherton, L. (2010). Predicting language outcomes at 4 years of age: Findings from early language in Victoria study. *Pediatrics*, *126*(6). https://doi.org/10.1542/peds.2010-0254

Rescorla, L., & Mirak, J. (1997). Normal language acquisition. *Seminars in Pediatric Neurology*, *4*(2), 70–76. https://doi.org/10.1016/S1071-9091(97)80022-8

Rinaldi, P., Bello, A., Simonelli, I., & Caselli, M. C. (2023). Is Specific Learning Disorder Predicted by Developmental Language Disorder? Evidence from a Follow-Up Study on Italian Children. *Brain Sciences*, *13*(4). https://doi.org/10.3390/brainsci13040701

Rudolph, J. M. (2017). Case history risk factors for specific language impairment: A systematic review and meta-analysis. *American Journal of Speech-Language Pathology*, *26*(3), 991–

1010. https://doi.org/10.1044/2016_AJSLP-15-0181

Sameroff, A. (2006). Child development. In A. Clarke-Stewart & J. Dunn (Eds.), *Families count: Effects on child and adolescent development* (pp. 53–76). Cambridge University Press. https://doi.org/https://doi.org/10.1017/CBO9780511616259.004

Sansavini, A., Favilla, M. E., Guasti, M. T., Marini, A., Millepiedi, S., Di Martino, M. V., Vecchi, S., Battajon, N., Bertolo, L., Capirci, O., Carretti, B., Colatei, M. P., Frioni, C., Marotta, L., Massa, S., Michelazzo, L., Pecini, C., Piazzalunga, S., Pieretti, M., … Lorusso, M. L. (2021). Developmental language disorder: Early predictors, age for the diagnosis, and diagnostic tools. A scoping review. *Brain Sciences*, *11*(5), 1–38. https://doi.org/10.3390/brainsci11050654

Schieve, L. A., Clayton, H. B., Durkin, M. S., Wingate, M. S., & Drews-Botsch, C. (2015). Comparison of Perinatal Risk Factors Associated with Autism Spectrum Disorder (ASD), Intellectual Disability (ID), and Co-occurring ASD and ID. *Journal of Autism and Developmental Disorders*, *45*(8), 2361–2372. https://doi.org/10.1007/s10803-015-2402-0

Schoon, I., Parsons, S., Rush, R., & Law, J. (2010). Children's language ability and psychosocial development: A 29-year follow-up study. *Pediatrics*, *126*(1), 73–80. https://doi.org/10.1542/peds.2009-3282

Sheldrick, R. C., Merchant, S., & Perrin, E. C. (2011). Identification of developmental-behavioral problems in primary care: A systematic review. *Pediatrics*, *128*(2), 356–363. https://doi.org/10.1542/peds.2010-3261

Shephard, E., Zuccolo, P. F., Idrees, I., Godoy, P. B. G., Salomone, E., Ferrante, C., Sorgato, P.,

Catão, L. F. C. C., Goodwin, A., Bolton, P. F., Tye, C., Groom, M. J., & Polanczyk, G. V. (2022). Systematic Review and Meta-analysis: The Science of Early-Life Precursors and Interventions for Attention-Deficit/Hyperactivity Disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *61*(2), 187–226. https://doi.org/10.1016/j.jaac.2021.03.016

Sim, F., Thompson, L., Marryat, L., Law, J., & Wilson, P. (2019). Preschool developmental concerns and adjustment in the early school years: Evidence from a Scottish birth cohort. *Child: Care, Health and Development*, *45*(5), 719–736. https://doi.org/10.1111/cch.12695

Skeat, J., Wake, M., Ukoumunne, O. C., Eadie, P., Bretherton, L., & Reilly, S. (2014). Who gets help for pre-school communication problems? Data from a prospective community study. *Child: Care, Health and Development*, *40*(2), 215–222. https://doi.org/10.1111/cch.12032

Smolla, N., Béliveau, M.-J., Breault, C., Noël, R., Lévesque, A., Gagné, G., Berthiaume, C., & Martin, V. (2018). Enfants d'âge préscolaire évalués en psychiatrie: l'inquiétude parentale concernant le langage dépend-elle de la sévérité des atteintes expressives et réceptives? *Canadian Journal of Speech-Language Pathology and Audiology*, *42*(1), 21–40.

Smolla, N., Lévesque, A., Berthiaume, C., & Martin, V. (2015). *La pertinence de l'inquiétude parentale pour le développement langagier du jeune enfant référé en psychiatrie*. *36*, 235–263.

Stanton-Chapman, T. L., Chapman, D. A., Kaiser, A. P., & Hancock, T. B. (2004). Cumulative Risk and Low-Income Children's Language Development. *Topics in Early Childhood Special Education*, *24*(4), 227–237. https://doi.org/10.1177/02711214040240040401

Tran, A. T., del Rosario, M., Nosco, E., Li, Y., Senturk, D., Mcdonald, N. M., Wilson, R. B., Dapretto, M., & Jeste, S. S. (2021). Early concerns in parents of infants at risk for autism. *Developmental Medicine and Child Neurology*, *63*(12), 1410–1416. https://doi.org/10.1111/dmcn.14925

Trevethan, R. (2017). *Sensitivity, Specificity, and Predictive Values: Foundations, Pliabilities, and Pitfalls in Research and Practice*. *5*(November), 1–7. https://doi.org/10.3389/fpubh.2017.00307

Uljarević, M., Katsos, N., Hudry, K., & Gibson, J. L. (2016). Practitioner Review: Multilingualism and neurodevelopmental disorders – an overview of recent research and discussion of clinical implications. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *57*(11), 1205–1217. https://doi.org/10.1111/jcpp.12596

Valade, F., Béliveau, M.-J., Breault, C., Chabot, B., & Labelle, F. (2022). *Individual and cumulative risk factors in developmental language disorder : A case-control study*. *0*(0), 1–17. https://doi.org/10.1177/13591045221113389

Vasileva, M., Graf, R. K., Reinelt, T., Petermann, U., & Petermann, F. (2021). Research review: A meta-analysis of the international prevalence and comorbidity of mental disorders in children between 1 and 7 years. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *62*(4), 372–381. https://doi.org/10.1111/jcpp.13261

Wakschlag, L. S., Roberts, M. Y., Flynn, R. M., Smith, J. D., Krogh-Jespersen, S., Kaat, A. J., Gray, L., Walkup, J., Marino, B. S., Norton, E. S., & Davis, M. M. (2019). Future Directions for Early Childhood Prevention of Mental Disorders: A Road Map to Mental Health, Earlier. *Journal of Clinical Child and Adolescent Psychology*, *48*(3), 539–554.

https://doi.org/10.1080/15374416.2018.1561296

Wallisch, A., Little, L., Dean, E., & Dunn, W. (2020). Parent concerns: Differentiating developmental diagnoses in young children. *Research in Developmental Disabilities*, *103*(December 2019), 1–7. https://doi.org/10.1016/j.ridd.2020.103684

Warnick, E. M., Bracken, M. B., & Kasl, S. (2008). Screening efficiency of the child behavior checklist and strengths and difficulties questionnaire: A systematic review. *Child and Adolescent Mental Health*, *13*(3), 140–147. https://doi.org/10.1111/j.1475-3588.2007.00461.x

Weisz, J. R., Chorpita, B. F., Frye, A., Ng, M. Y., Lau, N., Bearman, S. K., Ugueto, A. M., Langer, D. A., & Hoagwood, K. E. (2011). Youth top problems: Using idiographic, consumer-guided assessment to identify treatment needs and to track change during psychotherapy. *Journal of Consulting and Clinical Psychology*, *79*(3), 369–380. https://doi.org/10.1037/a0023307

Weitzman, C. C., Edmonds, D., Davagnino, J., & Briggs-Gowan, M. (2011). The association between parent worry and young children's social-emotional functioning. *Journal of Developmental and Behavioral Pediatrics*, *32*(9), 660–667. https://doi.org/10.1097/DBP.0b013e31822bc76b

Wichstrøm, L., Berg-Nielsen, T. S., Angold, A., Egger, H. L., Solheim, E., & Sveen, T. H. (2012). Prevalence of psychiatric disorders in preschoolers. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *53*(6), 695–705. https://doi.org/10.1111/j.1469-7610.2011.02514.x

Wilson, B. N., Neil, K., Kamps, P. H., & Babcock, S. (2013). Awareness and knowledge of developmental co-ordination disorder among physicians, teachers and parents. *Child: Care, Health and Development*, *39*(2), 296–300. https://doi.org/10.1111/j.1365-2214.2012.01403.x

World Health Organization. (2013). Mental Health Action Plan 2013-2020. In *World Health Organization*. https://doi.org/10.1207/s15327752jpa8601_03

Youngstrom, E. A. (2013). Future Directions in Psychological Assessment: Combining Evidence-Based Medicine Innovations with Psychology's Historical Strengths to Enhance Utility. *Journal of Clinical Child and Adolescent Psychology*, *42*(1), 139–159. https://doi.org/10.1080/15374416.2012.736358

Zablotsky, B., Black, L. I., Maenner, M. J., Schieve, L. A., Danielson, M. L., Bitsko, R. H., Blumberg, S. J., Kogan, M. D., & Boyle, C. A. (2019). Prevalence and trends of developmental disabilities among children in the United States: 2009–2017. *Pediatrics*, *144*(4), 2009–2017. https://doi.org/10.1542/peds.2019-0811